Annual Review 2019

Borg Panels Oberon

124 Lowes Mount Road, Oberon NSW

Borg Panels Pty Ltd

19 JULY 2019

Revision History

Rev No.	Revision Date	Author / Position	Details	Authorised	
				Name / Position	Signature
0	10/04/2019	Jacqueline Blomberg Environmental Manager	Draft		
1	19/07/2019	Jacqueline Blomberg Environmental Manager	Final for submission	Victor Bendevski Environmental and Regulatory Compliance	

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Annual Review Title Block.

Name of operation	Borg Panels Pty Ltd.
Name of operator	Borg Manufacturing
Development consent / project approval #	SSD 7016
Name of holder of development consent / project approval	Borg Construction
Mining lease #	N/A
Name of holder of mining lease	N/A
Water Access Licence #	80WA715797
Name of holder of water licence	Borg Panels Pty Ltd.
MOP/RMP start date	N/A
MOP/RMP end date	N/A

I, Victor Bendevski, certify that this audit report is a true and accurate record of the compliance status of Borg Panels Oberon for the period 1st May 2018 to 30th April 2019 and that I am authorised to make this statement on behalf of Borg Panels 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, $22,000, or both.)*

Name of authorised reporting officer	Victor Bendevski
Title of authorised reporting officer	Environment and Regulatory Compliance
Signature of authorised reporting officer	
Date	24/07/2019

1 Introduction

1.1 Scope

This Annual Review has been prepared for the Borg Panels Oberon site and covers the twelve-month reporting period from 1 May 2018 to 30 April 2019. This Annual Review has been prepared to satisfy Condition C11 of Development Consent SSD 7016 issued by the Minister for Planning on 29 May 2017.

The Borg Panels facility is located at 124 Lowes Mount Road, Oberon and consists of a Medium Density Fibreboard (MDF) manufacturing plant and a mouldings manufacturing plant. Construction of the particleboard manufacturing plant has been completed though not yet fully commissioned.

The Annual Review is submitted to NSW Department of Planning and Environment (DPE), NSW Environment Protection Authority (EPA) and Oberon Council to ensure all interested parties are kept informed of the environmental performance of the Development. The Annual Review is also available on the Borg Panels website.

Borg Panels generally maintained compliance with necessary approvals and licenses with the exception of EPL condition L2.5 Water Quality as listed in Table 1. The non-compliance is discussed in Section 4.4 Surface Water.

One environmental incident was reported to the EPA during this review period. This is discussed in Section 6.1 Incidents.

Table 1 Compliance

Relevant approval	Condition #	Condition description (summary)	Compliance status	Comment	Where addressed in Annual Review
EPL 3035	Section3, L4.1	Noise	Compliant		
EPL 3035	Section3, L2.4	Air Quality	Compliant		
EPL 3035	Section3, L2.5	Water Quality	Non-compliant	Exceedances of EPL 3035 discharge limits	4.4 Surface Water
WAL28951		Aquifer extraction	Compliant		

1.2 Background

In March 2010, Borg Panels acquired the former Carter Holt Harvey MDF and mouldings plant at Oberon. In 2012 Borg Panels further acquired the associated JeldWen factory that adjoins the MDF plant. Borg have integrated the facilities into one site, which they own and currently operate.

The Borg Panels facility manufactures a range of MDF products (Custom wood) including:

- Standard MDF;
- Moisture Resistant MDF;
- E0 (Low Formaldehyde Emitting) MDF;
- Ultraprime MDF Mouldings;
- Decorative Laminated MDF and Particle Board; and
- Treated paper for the lamination of MDF and Particle Board.

The Borg Panels facility forms part of the wider Oberon Timber Complex.

Figure 1 Regional context

1.3 Consent

Development Consent SSD 7016 was issued by the Minister for Planning on 29 May 2017 to construct and operate a particleboard facility, and to continue operating and make modifications and additions to the existing MDF facility.

Condition A26 of SSD 7016 required Borg Panels to modify DA27/95. Borg submitted a Section 4.55 (then Section 96) Modification Application to SSD 7016 requesting removal of condition A26. This Application also included a minor change to the orientation of the material handling building at particleboard, and an increase to the warehouse footprint and amendments to the stormwater management system at the northern section of the site. A determination was received from the Department approving this application (SSD 7016 MOD 1 – Site layout changes) on 20 November 2018.

A summary of development consents including modifications currently held by Borg Panels is presented in Table 2.

Table 2 Borg Panels Development Consents

Consent Description	Date	Approval Authority	Approved Development
Development Consent SSD 7016	29 May 2017	Minister for Planning	Construction and operation of a particle board facility and continuation of, and alterations and additions to, the existing medium density fibreboard facility.
Development Consent SSD 7016 MOD 1	20 November 2018	Minister for Planning	Site layout changes Surrender of DA27/95

1.4 Annual Review Requirements

In accordance with Condition C11 of Development Consent SSD 7016, annual review requirements and the sections within this review where these are addressed have been summarised in Table 3.

Table 3 Annual Review Requirements

Development Consent SSD 7016 – Condition C11	Section of Annual Review
By 31 July 2017, and each year thereafter, unless otherwise agreed by the Secretary, the Applicant must review and submit a report to the Secretary detailing the environmental performance of the Development to the satisfaction of the Secretary. This review must:	This Report
(a) describe the development that was carried out during the reporting period, and the development that is proposed to be carried out over the next reporting period;	Section 2 Section 7
(b) include a comprehensive review of the monitoring results and complaints records of the Development over the previous reporting period, which includes a comparison of these results against the: i. relevant statutory requirements, limits or performance measures/criteria; ii. requirements of any plan or program required under this consent; iii. the monitoring results of previous years; and iv. the relevant predictions in the EIS;	Section 4 Section 5
(c) identify any non-compliance during the reporting period, and describe what actions were (or are being) taken to ensure compliance;	Section 4 Section 6
(d) identify any trends in the monitoring data over the life of the Development;	Section 4
(e) identify any discrepancies between the predicted and actual impacts of the Development, and analyse the potential cause of any significant discrepancies; and	Section 4
(f) describe what measures will be implemented over the next reporting period to improve the environmental performance of the Development.	Section 7

1.5 Environment Protection Licence

Borg Panels operates in accordance with Environment Protection Licence 3035 (EPL 3035), issued on 14 February 2001 by the NSW Environment Protection Authority (EPA) under Section 55 of the *Protection of the Environment Operations Act 1997*. The current Licence version date is 15 October 2018.

1.6 Water Licences

Borg Panels holds a Water Access Licence for use of groundwater in operations. Current licence details issued under the *Water Management Act 2000* are summarised in Table 4.

Table 4 Water Licences

Approval Details	Approval Number	Validity of Licence	Approval Kind	Extraction Limit
WAL28951	80WA715797	16 January 2012 – 01 March 2026	Water Extraction	28 Units

1.7 Trade Waste Licence

Borg Panels Trade Waste Service Contract with Oberon Council for the discharge of liquid trade wastes into Council's sewerage system was not applicable this reporting period as there was no renewal of the licence. Borg Panels now treats its liquid trade waste on site.

1.8 Environmental Management Plans

As per Schedule 2 Part C of SSD 7016, construction activities continue to be undertaken in accordance with the Construction Environmental Management Plan (CEMP) and the existing development in accordance with the Operational Environmental Management Plan (OEMP) and associated sub-plans.

In accordance with C10 Revision of Strategies, Plans and Programs, environmental management plans were reviewed, and minor amendments made where necessary.

1.9 Contacts

Table 5 outlines the contact details for site personnel responsible for operating the Borg Panels facility.

Table 5 Site Personnel

Name	Title	Contact Details
Tony Truscott	Operations Manager - Oberon	+61 436 613292
Sharon Cutting	Work, Health, Safety and Environment Coordinator	+61 408 635258
Victor Bendevski	Environmental and Regulatory Compliance	(02) 4340 9827
Jacqueline Blomberg	Environmental Manager	+61 436 609 556

1.10 Actions Required from Previous Annual Review

The following actions were identified in the 2017-2018 Annual Review for implementation during this reporting period.

Table 6 Proposed Activities for 2018-19 Reporting Period

	Activities Proposed in 2018-19 Reporting Period	Results achieved
1	Continue implementation of the Operational Environmental Management Plan (OEMP) for the existing development. Review and update environmental management plans and sub plans for the project. Reinforce environmental awareness training.	Ongoing implementation of the OEMP and sub plans. CEMP, OEMP and sub plans reviewed and updates performed where: a) changes to site operations (existing and project); and b) in accordance with SSD 7016 C10. Environmental Awareness Training Packages for Air, Noise, Water and Waste were developed with majority of site personal trained and assessed in the Water and Noise packages during this review period.
2	Continue construction of the particleboard plant and begin commissioning.	Majority of the proposed construction activities for the particleboard plant were successfully completed during this reporting period. Those not completed are chiefly items that form SSD 7016 MOD 1. Other objectives which are near completion include: • upgrade of southern boundary swales • final commissioning of particleboard plant
3	Continue with implementation of various management and mitigation measures as detailed in the development consent.	Site inspections undertaken regularly to: • maintain compliance • identify required actions • identify additional controls to be established • identify additional management and/or mitigation measures where required
4	Complete Pollution Reduction Program for the site. Begin implementation of recommendations.	Commenced discussion regarding formaldehyde study with air quality consultant Todoroski Air Sciences.
5	Complete construction of the sedimentation dams and emergency catchment.	Construction of dam and catchment done though not on line as swale connecting dam to existing stormwater system not complete.
6	Begin construction of building and associated equipment at the northern end of the site.	Commenced earthworks at northern area of site for warehouse extension and installation of stormwater infrastructure.
7	Conduct training surrounding incident reporting with a specific focus on content requirements.	EHSR Alert: Environmental Incident Reporting issued to site 8 October 2018 concisely outlines content requirements. Agenda item for discussion at monthly environmental meetings attended by Area Coordinators and Supervisors.

2 Operations during the Reporting Period

2.1 Production

Development Consent SSD 7016 allows for production of up to 380,000 m^3 of MDF and 500,000 m^3 of particleboard per calendar year.

During the reporting period the Borg Panels facility manufactured 247,767 m^3 of MDF board. The particleboard plant was not fully commissioned during this reporting period hence no particleboard was produced.

2.2 Facility Improvements

The following improvements were made to existing site infrastructure, plant and/or equipment as a result of hazard identification or environmental incidents that occurred during the reporting period:

- Adjusted automatic fire monitoring foam deluge system in the hot oil room at particleboard to active upon detection of fire only (i.e. not smoke)
- Additional noise attenuation installed to new chipper/debarker room
- Additional stormwater isolation valve installed at swale drainage channel adjacent transformer yard
- Adjust work activities along the northern section of site to better manage noise nuisance to adjacent residents
- Additional bunding installed to the hot oil room and chemical storage shed

2.3 Site Activities

The following activities associated with the ongoing construction of the particleboard facility and modifications to existing operations occurred during the reporting period:

- Completed construction of the new first flush basin and emergency catchment pond. Infrastructure points 31 & 32 in Figure 2.
- Completed construction of enclosed chipper/debarker and chip silos. Infrastructure points 11 & 13 in Figure 2
- Commenced construction of new Gate House and associated ancillaries for Gate 4
- Commenced earthworks at northern boundary in preparation for construction of mouldings warehouse. Infrastructure point 22 in Figure 2.
- Commenced modification to surface water management system.

Environmental commitments and management/mitigation measures that were applied during the reporting period include the following:

- Operational works undertaken in accordance with the Operational Environmental Management Plan and sub-plans

- Construction works undertaken in accordance with the Construction Environmental Management Plan and sub-plans
- Environmental awareness training packages developed and commenced roll out to employees
- Site wide spill kit audit
- Review of site bunding

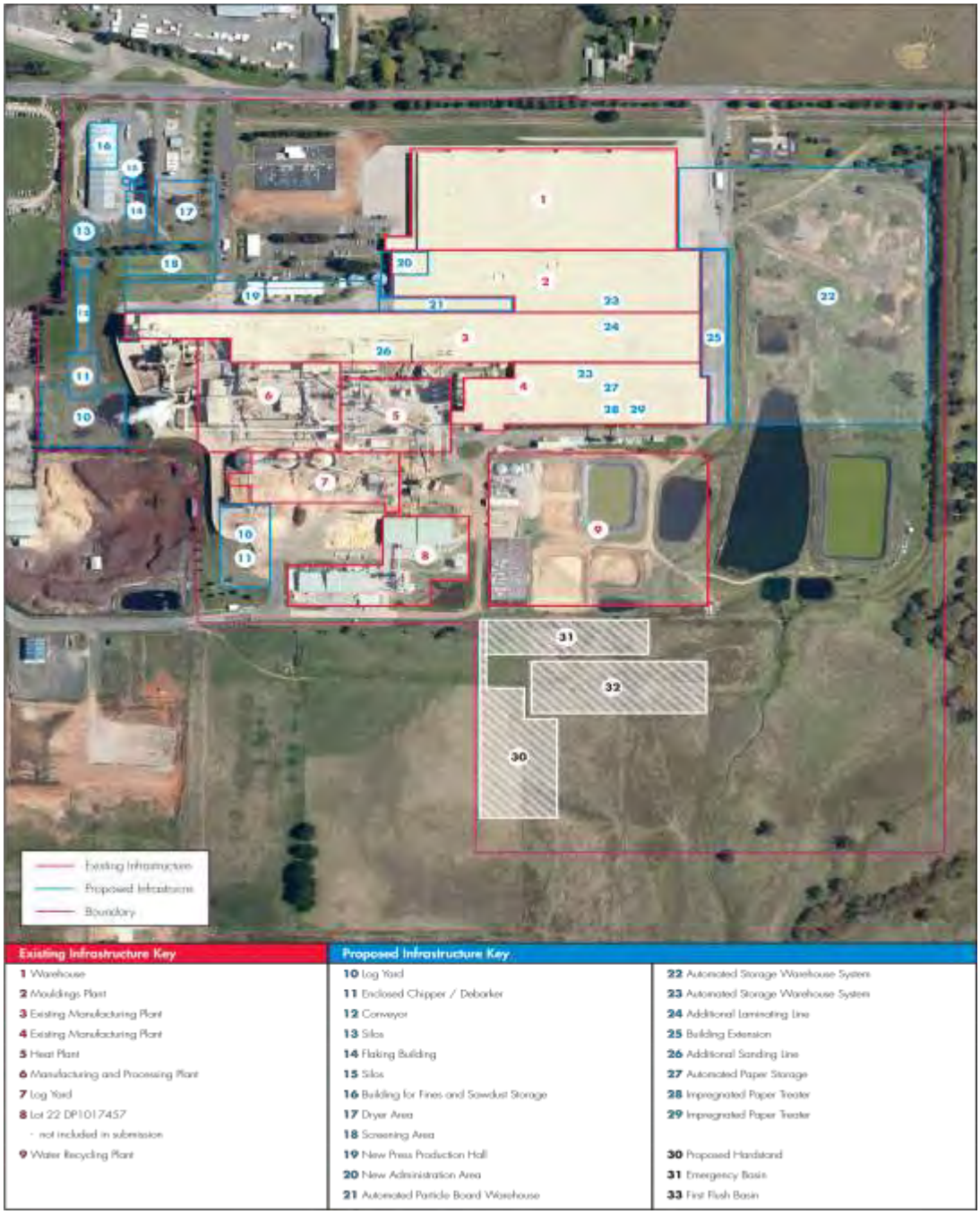


Figure 2 SSD 7016 MOD 1 Approved development area

3 Waste Management

Waste generated at the Borg Panels site is managed in accordance with the Waste Management Plan. The waste management process incorporates a system of recycling and re use of waste materials generated on site. Waste that cannot be incorporated into this system is removed from site and taken to landfill for disposal.

3.1 Liquid and Solid Waste

A summary of the date, quantity, description and destination of waste removed from the Borg Panels facility during the reporting period is provided in Table 7.

Table 7 Waste Management 2018-19

Month	Quantity			Description	Destination
	m^3	Litres	Tonnes		
May 2018			10.82	Waste requiring burial	Bathurst Regional Council
	70			Ash	Oberon Council Waste Depot
	895			General	Oberon Council Waste Depot
	60			Building and demolition	Oberon Council Waste Depot
June 2018	30			Ash	Oberon Council Waste Depot
	450			General	Oberon Council Waste Depot
July 2018			9.36	Waste requiring burial	Bathurst Regional Council
	60			Ash	Oberon Council Waste Depot
	540			General	Oberon Council Waste Depot
August 2018			10.46	Building and demolition	Bathurst Regional Council
		4000		Waste oil	Cleanaway Nationwide Oil Pty Ltd
	70			Ash	Oberon Council Waste Depot
	600			General	Oberon Council Waste Depot
September 2018			19.16	Building and demolition	Bathurst Regional Council
		7244		Paint wash water	Environmental Treatment Solutions
	80			Ash	Oberon Council Waste Depot
	660			General	Oberon Council Waste Depot
October 2018			22.42	Waste requiring burial	Bathurst Regional Council
		2200		Waste oil	Cleanaway Nationwide Oil Pty Ltd
	60			Ash	Oberon Council Waste Depot
	430			General	Oberon Council Waste Depot
November 2018			8.70	Building and demolition	Bathurst Regional Council
	50			Ash	Oberon Council Waste Depot
	520			General	Oberon Council Waste Depot
December 2018		2400		Waste oil	Cleanaway Nationwide Oil Pty Ltd
	70			Ash	Oberon Council Waste Depot

Month	Quantity			Description	Destination
	m^3	Litres	Tonnes		
	525			General	Oberon Council Waste Depot
January 2019			10.68	Building and demolition	Bathurst Regional Council
			28.08	Waste requiring burial	Bathurst Regional Council
	20			Ash	Oberon Council Waste Depot
	500			General	Oberon Council Waste Depot
February 2019			27.70	Waste requiring burial	Bathurst Regional Council
	70			Ash	Oberon Council Waste Depot
	480			General	Oberon Council Waste Depot
March 2019			28.88	Waste requiring burial	Bathurst Regional Council
	70			Ash	Oberon Council Waste Depot
	690			General	Oberon Council Waste Depot
April 2019			14.06	Waste requiring burial	Bathurst Regional Council
	140			Ash	Oberon Council Waste Depot
	605			General	Oberon Council Waste Depot
TOTAL	**7215**			**General Waste**	**Oberon Council Waste Depot**
	60			**Building Demolition Waste**	**Oberon Council Waste Depot**
	830			**Ash**	**Oberon Council Waste Depot**
			49	**Building Demolition Waste**	**Bathurst Regional Council**
			204.38	**Waste requiring Burial**	**Bathurst Regional Council**
		8,600		**Waste Oil**	**Cleanaway Nationwide Oil Pty Ltd**
		7244		**Paint wash water**	**Environmental Treatment Solutions**

Waste types in Table 7 are further described as:

- General waste including a mix of both putrescible and non-putrescible waste;
- Bottom ash being the ash removed from the furnaces;
- Waste requiring burial made up of urea formaldehyde spade-able resin and paraffin wax bladders;
- Building and demolition waste including bricks, concrete, paper, plastics, glass, metal and timber are recycled when appropriate; and
- Used oils from the plant process oil systems and mechanical workshop are recycled off site via third parties.

Paint wash waste was generated by the facility during this reporting period which required tracking during transport, as shown in Table 8. This waste was removed from site by Environmental Treatment Solutions (EPL 13157) under Transport Certificate 2T00923592. A copy of this record has been retained on site. Borg Panels will retain this certificate for four years.

Table 8 Types and Quantities of Trackable Waste Generated 2018-19

Liquid Waste (Litres)					Hazardous Waste (Tonnes)	
Waste Oil	**Oily Water**	**Liquid Resin**	**Paint Waste**	**Laboratory Waste**	**UV Paint Solvent**	**UV Paint Rags**
Nil	Nil	Nil	7,244	Nil	Nil	Nil

3.2 Trade Waste

Borg Panels Trade Waste Service Contract with Oberon Council, for the discharge of liquid trade wastes into Council's sewerage system, was not applicable this reporting period as there was no renewal of the licence. Borg Panels now treats its liquid trade waste on site.

4 Environmental Monitoring and Performance

4.1 Environmental Management System

Borg Panels operates in accordance with the Operational Environmental Management Plan (OEMP) as documented in Section 1.8. This OEMP aims to ensure adequate management, monitoring and mitigation systems are in place to protect the surrounding environment.

Similarly, construction activities are undertaken in accordance with the Construction Environmental Management Plan (CEMP).

Environmental monitoring is conducted in accordance with the requirements of Development Consent SSD 7016 and EPL 3035. Environmental monitoring is an integral part of the environmental management system. The measurement and evaluation of monitoring results allows for the assessment of performance against quantitative and qualitative standards and assists in the identification of any non-conformances or areas that may require additional attention.

4.2 Meteorological Data

Borg Panels operate and maintain a meteorological monitoring station located east of the existing Spring Dam (EPA Identification Point 26). The following section summarises the meteorological data for the 2018-19 reporting period.

4.2.1 Rainfall

The total monthly rainfall (mm) and number of rain days during the reporting period is shown in Table 9 and Figure 1. A total rainfall of 922.8mm was recorded during the 2018-19 reporting period. This is 85.2mm above the annual mean rainfall (837.6mm) for the Oberon region (Bureau of Meteorology, Oberon Springbank Site No. 063063).

Table 9 Recorded Rainfall 2018-19

Total Monthly Rainfall (mm)												
May	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**Total**
58.6	62.2	125.8	88	71	49.4	116.8	63.6	129.4	56.8	96.8	4.4	922.8
Number of Rain Days (≥0.2mm)												
14	19	14	16	9	13	12	6	12	5	12	14	146

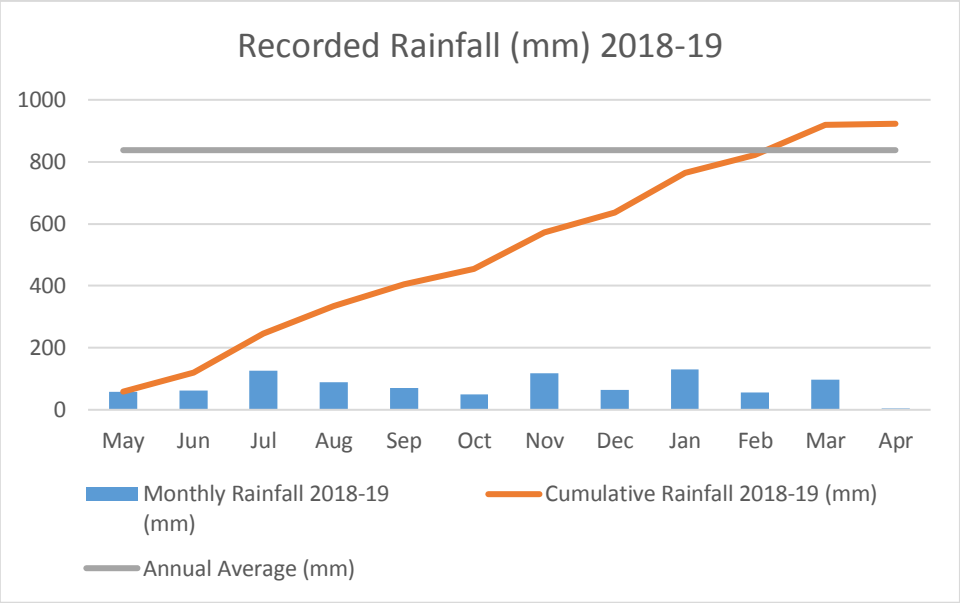


Figure 3 Recorded Rainfall at Borg Panels Meteorological Station (mm) 2018-2019

4.2.2 Temperature

Monthly maximum and minimum temperatures recorded during the reporting period are shown in Table 10.

Table 10 Monthly Minimum and Maximum Temperatures 2018-19

Minimum and Maximum Monthly Temperatures (°C)											
May	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**
-3.5	-5.5	-7.1	-5.9	-4.4	-1	-0.1	4.5	11.5	5.2	2.7	-2.3
19.2	12	13.7	14.6	20.3	23.7	26.6	33.6	36.3	30.8	30.3	24.1

4.2.3 Wind Speed and Direction

The recorded wind speed and direction data is summarised in Table 11. The annual wind rose for the reporting period is displayed in Figure 4.

Table 11 Monthly Daily Wind Data 2018-19

Month	Maximum Wind Speed (km/hr)	Mean Wind Speed (km/hr)	Dominant Wind Direction
May 2018	51.6	10.8	ESE - W
June 2018	42.6	13.7	SE - W
July 2018	53.7	13.5	WNW - W
August 2018	54.9	14.5	WSW
September 2018	54.1	12.9	SW
October 2018	51.4	13.0	E
November 2018	59.8	14.0	W
December 2018	59.0	11.1	ESE
January 2019	53.7	10.4	SSE - E
February 2019	54.7	15.6	E
March 2019	51.5	12.3	ESE
April 2019	47.2	10.4	E

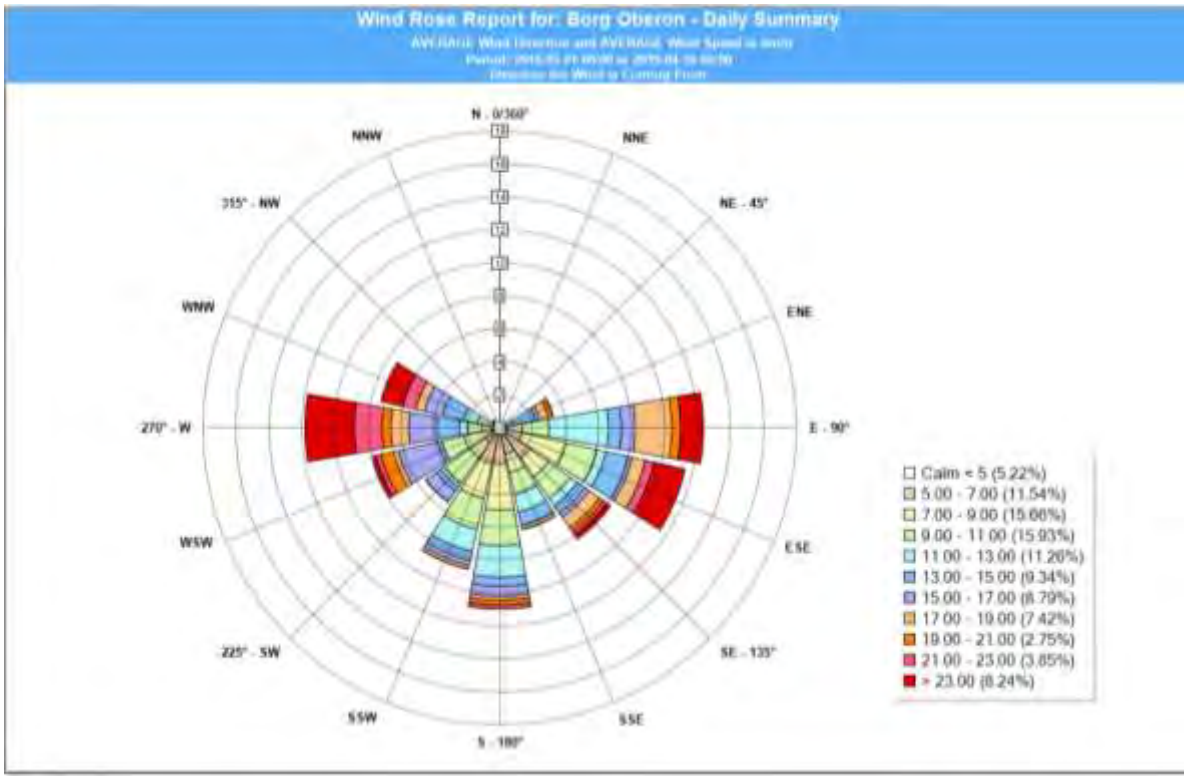


Figure 4 Daily Summary Average Wind Rose 2018-2019

4.3 Air Quality

4.3.1 Dust Depositional Gauges

Borg Panels operates six dust depositional gauges within and around the facility. The location of dust depositional gauges is listed in Table 12 and shown in Figure 5.

Figure 5 Depositional Dust Gauge Locations

Table 12 Location of Dust Depositional Gauges

Dust Depositional Gauge	Location Description
DDG 1	Borg Panels eastern boundary with Woodchem
DDG 2	South West of Conti 2
DDG 3	Water treatment plant
DDG 4	Water treatment plant
DDG 5	Highlands Motor Inn, South of Borg Panels Plant
DDG 6	Albion Street, East of Borg Panels plant

Dust deposition monitoring is undertaken in accordance with the Borg Panels Operational Air Quality Management Plan (OAQMP). Dust deposition monitoring is not a requirement of a consent or licence however, it is conducted to assist with site management.

DDGs 1 to 4 are located on the periphery of the site. DDG 5 and DDG 6 are located at sensitive receivers.

DDG 1 is located within the operational boundary of the site immediately adjacent to an unsealed laydown area and in general proximity of an unsealed road. DDG 2 is located immediately adjacent to an active construction site. The dust deposition criterion however does not apply to the on-site dust conditions, only off-site dust levels.

DDG 5 and DDG 6 results were generally well below the applicable dust deposition criterion (4mg/m^2) with the exception of minor exceedances at DDG 5 for December 2018 (4.9 g/m^2/month) and February 2019 (4.5 g/m^2/month). It is unlikely that these exceedances were resultant of Borg Panels operations or construction activities due to dominant wind direction in December being East-South-East and February, East (see Table 11). The annual average recorded for DDG 5 is well under the criteria of 4mg/m^2 (see Table 14).

The air quality criteria adopted for Borg Panels for deposited dust is provided in Table 13.

Table 13 Air Quality Criteria Deposited Dust

Averaging Period	Impact	Criteria
Annual	Incremental	2 g/m^2/month
	Total	4 g/m^2/month

Deposited dust is assessed as insoluble solids as defined by *Standards Australia AS3580.10.1-2003: Methods for Sampling and Analysis of Ambient Air – Determination of Particulates – Deposited Matter – Gravimetric Method*.

During the reporting period all dust samples were collected by trained specialists and analysed by NATA certified laboratories.

Table 14 provides a summary of Borg Panels annual average results for insoluble solids during the reporting period and for previous two years. Monthly data and rolling annual average data is provided in Appendix A.

Table 14 Dust Depositional Gauges Annual Average

No.	Location	Annual Average Insoluble Solids (g/m^2/month) 2016/17	Annual Average Insoluble Solids (g/m^2/month) 2017/18	Annual Average Insoluble Solids (g/m^2/month) 2018/19
DDG 1	Borg Panels eastern boundary with Woodchem	10.1	9.4	9.3
DDG 2	South West of Conti 2	2.6	3.9	5.2
DDG 3	Water treatment plant	1.0	1.2	2.7
DDG 4	Water treatment plant	0.6	0.9	2.9
DDG 5	Highlands Motor Inn	1.6	1.7	1.9
DDG 6	Albion Street east of Borg Panels plant	0.7	0.9	1.7

DDG 1 and DDG 2 returned results showing exceedances of the annual average criteria of 4mg/m^2. All other monitoring points were below the annual average criteria.

Annual average results exceeding the criteria adopted by Borg Panels at DDG 1 and DDG 2 can be attributed to the dust gauge locations on site, that being adjacent an unsealed internal road (DDG 1), and adjacent a construction zone where earthworks were being

undertaken (DDG 2). Both of these internal areas are exposed to regular traffic and day-to-day activities.

Dust management measures are listed in Section 7.5 Air Quality (Dust) Management within the CEMP. Measures include but are not limited to evaluation of weather conditions (wind speed and direction), use of water cart to spray unsealed surfaces and stockpiles, limited stockpile heights and clear communication to workers regarding their responsibilities to assist with managing dust via toolbox meetings.

4.3.2 Air Emissions

In accordance with EPL 3035, Borg Panels monitor air emissions from the plant. The locations of air emission monitoring points are listed in Table 15. There are no air emission monitoring requirements under SSD7016. Full laboratory results are attached to this document as Appendix B.

Table 15 Location of Air Emissions Monitoring

EPA Identification No.	Description
4	DC1 Baghouse
5	DC2 Baghouse
7	Conti 2 Stage 1 Dryer Cyclone #1 (west)
8	Conti 2 Stage 1 Dryer Cyclone #2 (east)
9	Conti 1 Dryer Cyclone #1 (south)
10	Conti 1 Dryer Cyclone #2 (north)
11	Conti 2 Heat Plant
12	Press Vents Conti 1
13	Press Vents Conti 2
17	Conti 1 Heat Plant
18	Press exhaust vents discharge
19	Dryer stack
20	Reject cyclone DC 11
21	Reject cyclone DC 12
22	Reject cyclone DC 13
27	Combined Stack Venting Conti 2 Press Vents

While EPA Identification Points 18, 19, 20, 21 and 22 are recognised as discharge points in EPL 3035, there is no requirement to monitor the concentration of pollutants discharged at these points. In any case, this plant is dormant.

Similarly, Point 17 does not produce flow as this exhaust is ducted back into the Conti 1 production system. There is no requirement to monitor the concentration of pollutants discharged at this point, as there are no emissions generated.

Point 13 was not monitored this year as the new press extraction system was installed and monitored under the newly created Point 27. Point 27 had intended to incorporate Points 4 &

5 but connection works have not been completed hence results were recorded independently for Points 4, 5, & 27.

Environment Protection Licence 3035 sets pollution concentration limits for existing emission points at the facility as shown in Table 16. Monitoring results are assessed against these criteria to determine compliance with EPL limits.

Table 16 EPL 3035 Air Concentration Limits

Pollutant	Units of Measure	100 Percentile Concentration Limit
Solid Particulates	mg/m^3	200
Volatile Organic Compounds	mg/m^3	10
Formaldehyde	mg/m3	5

Source: NSW EPA EPL 3035 (15 October 2018)
mg/m^3 = milligrams per cubic metre

Emissions to air monitoring is performed in accordance with the methodologies recommended by the NSW Office of Environment and Heritage as specified in the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (January 2007) and the requirements of EPL 3035. USEPA Method GD-008 is the approved method for determining flow rate and sampling for particulate matter in cyclonic flow from licenced discharge points 7, 8, 9 & 10.

Air emission monitoring was undertaken by trained specialists and samples analysed by NATA certified laboratories. Monitoring equipment is maintained and calibrated in accordance with the manufacturer's specifications by qualified specialists.

For each discharge point identified in Table 15, Borg Panels monitored the concentration of each pollutant as specified in EPL 3035. Current reporting period results are compared against results from the previous two years in Table 17-29.

Table 17 Air Emissions Monitoring Results EPA Identification Point 4

Pollutant	Units	Frequency	2016/17	2017/18	2018/19
Particulate Matter	mg/m^3	Yearly	2.3	<2	3.3
Formaldehyde	mg/m^3	Yearly	3.7	1.8	2.8

Table 18 Air Emissions Monitoring Results EPA Identification Point 5

Pollutant	Units	Frequency	2016/17	2017/18	2018/19
Particulate Matter	mg/m^3	Yearly	2.3	2.2	3.1
Formaldehyde	mg/m^3	Yearly	3.7	<0.02	1.5

Table 19 Air Emissions Monitoring Results EPA Identification Point 7

Pollutant	Units	Frequency	2016/17	2017/18	2018/19
Particulate Matter	mg/m^3	Yearly	40	29	43

Table 20 Air Emissions Monitoring Results EPA Identification Point 8

Pollutant	Units	Frequency	2016/17	2017/18	2018/19
Particulate Matter	mg/m^3	Yearly	33	26	43

Table 21 Air Emissions Monitoring Results EPA Identification Point 9

Pollutant	Units	Frequency	2016/17	2017/18	2018/19
Particulate Matter	mg/m^3	Yearly	9.8	36	21
Formaldehyde	mg/m^3	Yearly	1.1	5.8	4.8
Nitrogen Oxides	mg/m^3	Yearly	150	220	88
PM10	mg/m^3	Yearly	5.9	32	18
Smoke Emissions	Percent Opacity	6 Monthly	-	1	0
Volatile Organic Compounds	mg/m^3	Yearly	2.9	8.2	5.5

Table 22 Air Emissions Monitoring Results EPA Identification Point 10

Pollutant	Units	Frequency	2016/17	2017/18	2018/19
Particulate Matter	mg/m^3	Yearly	21	42	28
Formaldehyde	mg/m^3	Yearly	2.4	6.5	4.9
Nitrogen Oxides	mg/m^3	Yearly	170	220	63
PM10	mg/m^3	Yearly	8	36	23
Smoke Emissions	Percent Opacity	6 Monthly	-	1	0
Volatile Organic Compounds	mg/m^3	Yearly	5.3	2.4	8.2

Table 23 Air Emissions Monitoring Results EPA Identification Point 11

Pollutant	Units	Frequency	2016/17	2017/18	2018/19
*Particulate Matter	mg/m^3	Yearly	130*	140*	140*
Formaldehyde	mg/m^3	Yearly	<0.01	1.9	0.34
Nitrogen Oxides	mg/m^3	Yearly	530	670	550
*PM10	mg/m^3	Yearly	80*	97*	78*
Volatile Organic Compounds	mg/m^3	Yearly	0.12	0.26	0.4
Smoke Emissions	Percent Opacity	6 Monthly	0	0	0

Note: * Corrected to 6.5% CO_2 mg/m^3

Table 24 Air Emissions Monitoring Results EPA Identification Point 12

Pollutant	Units	Frequency~	2016/17	2017/18	2018/19
Particulate Matter	mg/m^3	Every 3 years	-	29	-
Formaldehyde	mg/m^3	Every 3 years	-	2.5	-
Nitrogen Oxides	mg/m^3	Every 3 years	-	<3	-
PM10	mg/m^3	Every 3 years	-	24	-
Volatile Organic Compounds	mg/m^3	Every 3 years	-	0.88	-

Note: ~ Special Frequency 1

Table 25 Air Emissions Monitoring Results EPA Identification Point 13

Pollutant	Units	Frequency	2016/17	2017/18	2018/19
Particulate Matter	mg/m^3	Every 3 years	-	-	-
Formaldehyde	mg/m^3	Every 3 years	-	-	-
Nitrogen Oxides	mg/m^3	Every 3 years	-	-	-
PM10	mg/m^3	Every 3 years	-	-	-
Volatile Organic Compounds	mg/m^3	Every 3 years	-	-	-
Carbon Dioxide	mg/m^3	Every 3 years	-	-	-
Carbon Monoxide	mg/m^3	Every 3 years	-	-	-

Note: EPA Point 13 No longer in use.

Table 26 Air Emissions Monitoring Results EPA Identification Point 17

Pollutant	Units	Frequency	2016/17~	2017/18~	2018/19~
Particulate Matter	mg/m^3	Yearly	-	-	-
Formaldehyde	mg/m^3	Yearly	-	-	-
Nitrogen Oxides	mg/m^3	Yearly	-	-	-
PM10	mg/m^3	Yearly	-	-	-
Volatile Organic Compounds	mg/m^3	Yearly	-	-	-
Smoke Emissions	percent Opacity	Every 6 months	-	-	-

Note: * Corrected to 6.5% CO2 mg/m^3
~ No flow. Exhaust from Conti 1 Heat Plant now ducted back into the Conti 1 production system

Table 27 Air Emissions Monitoring Results EPA Identification Point 18

Pollutant	Units	Frequency	2016/17	2017/18	2018/19
Particulate Matter	mg/m^3	Every 3 years	Dormant	Dormant	Dormant
Formaldehyde	mg/m^3	Every 3 years	Dormant	Dormant	Dormant
Volatile Organic Compounds	mg/m^3	Every 3 years	Dormant	Dormant	Dormant
Velocity	mg/sec	Every 3 years	Dormant	Dormant	Dormant

Table 28 Air Emissions Monitoring Results EPA Identification Point 19

Pollutant	Units	Frequency	2016/17	2017/18	2018/19
Particulate Matter	mg/m^3	Yearly	Dormant	Dormant	Dormant
Nitrogen Oxides	mg/m^3	Yearly	Dormant	Dormant	Dormant
Volatile Organic Compounds	mg/m^3	Yearly	Dormant	Dormant	Dormant
Velocity	mg/sec	Yearly	Dormant	Dormant	Dormant

Table 29 Air Emissions Monitoring Results EPA Identification Point 27

Pollutant	Units	Frequency	2016/17	2017/18	2018/19
Particulate Matter	mg/m^3	Yearly	N/A	15	5.3
Formaldehyde	mg/m^3	Yearly	N/A	1.5	2.1
Nitrogen Oxides	mg/m^3	Yearly	N/A	<3	<20

PM10	mg/m^3	Yearly	N/A	15	2.2
Volatile Organic Compounds	mg/m^3	Yearly	N/A	0.27	0.66

Special Frequency 1 (i.e. every 3 years) applies to EPA Identification Points 12, 13 & 18. EPA Identification Point 13 is no longer in use and been replaced by Point 27 (which was sampled in this review period), and EPA Identification Point 18 is currently dormant. EPA Identification Point 12 is next due for sampling in 2021. Environmental Protection Licence 3035 does not specify air concentration limits for these monitoring points.

There were nil exceedances of air concentration limits during this reporting period.

4.4 Surface Water

The existing surface water management system includes runoff from Borg Panels site and adjoining properties in the Oberon Timber Complex on the western side of Lowes Mount Road, and operates as follows:

- Runoff from Structaflor particleboard flooring facility and Highland Pine Products Sawmill 2 flows across Lowes Mount Road and directed onto the site via a 'dirty' water swale.
- Clean water from rural undeveloped parts of Lowes Mount Road is also directed into the site, conveyed via a 'clean' water swale, which runs alongside the dirty water swale following the northern boundary before discharging to a tributary of Kings Stockyard Creek.
- Borg Panels roof and surface runoff from the western side of the facility is directed into the dirty water swale and transferred into the stormwater basin.
- Runoff from the eastern and open parts of the site, which contains fine fibrous wood material, is directed first to a gross pollutant trap and then into the stormwater basin.
- Runoff from the construction site is managed in accordance with Erosion Sediment Control Plans as part of the CEMP for SSD7016. Surface water from construction zones is directed into the dirty water swale, then to the stormwater basin.
- Water discharges from the EPA Pt 1 V-notch (shown on Figure 5) to a tributary of Kings Stockyard Creek.

In accordance with EPL 3035, Borg Panels undertakes water quality monitoring weekly during discharge at the V-notch weir shown in Figure 5 (EPA Pt 1) to manage compliance requirements.

EPA Pt 28 has been included in EPL 3035 as a discharge and monitoring point for the new First Flush Basin also shown in Figure 5. As construction of the First Flush Basin was not complete during this review period (i.e. connection swale from the Basin to the tributary/unnamed creek), no monitoring was performed at EPA Pt 28 as there was no discharge. Surface water management at the site remains as per the above discussion.

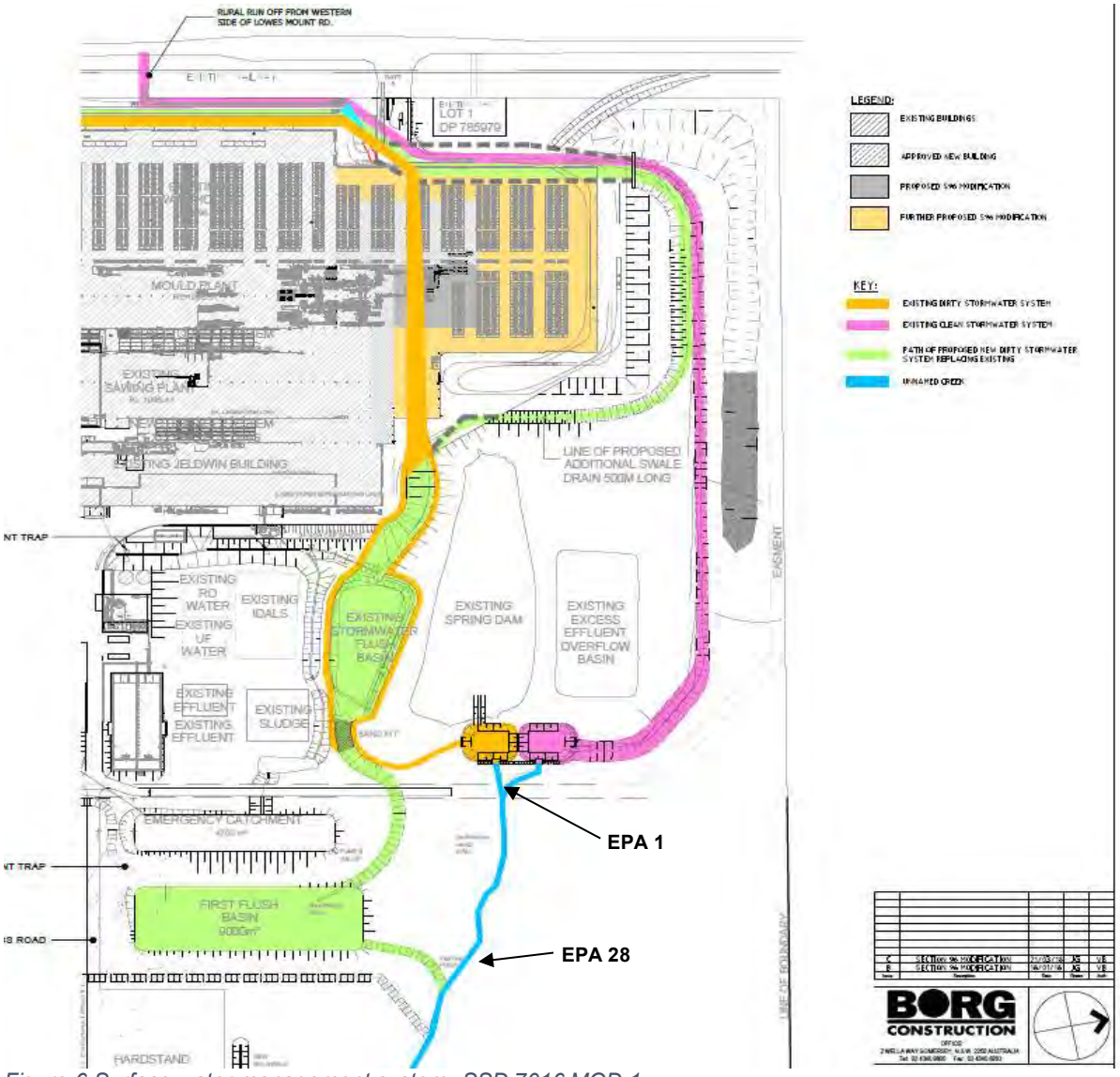


Figure 6 Surface water management system- SSD 7016 MOD 1

The concentration limit of a pollutant discharged from EPA Point 1 & 28 are set in EPL 3035 and shown below in Table 30.

Table 30 EPA Identification Point 1- Water pollution limits

Pollutant	Units of Measure	50 percentile concentration limit	100 percentile concentration limit
Aldrin	µg/L		0.3
Biochemical Oxygen Demand (BOD)	mg/L		20
Colour	Hazen	80	160
Dieldrin	µg/L		0.3
Methylene Blue Active Substances (MBAS)	mg/L		0.5
Nitrogen (Total)	mg/L		10
Oil and Grease	mg/L		10
pH	pH		6.5-8.5

Phosphorus (Total)	mg/L		0.3
Total Suspended Solids	mg/L		50

Stormwater samples are collected by trained Borg personnel and analysed by NATA certified laboratories.

Table 31 provides a summary of Borg Panels annual average water monitoring results for discharge from EPA Point 1 during the reporting period and for the previous two years. Full results for the 2018-19 reporting period are provided in Appendix C Surface Water Monitoring Data.

Table 31 Annual Average Water Quality Monitoring Results EPA Point 1

Pollutant	Units of Measure	2016/17	2017/18	2018/19
Aldrin	µg/L	0	0	0
Biochemical Oxygen Demand (BOD)	mg/L	3.4	12.5	15.1
Colour	Hazen	63.6	77.5	120.1
Dieldrin	µg/L	0	0	0
Methylene Blue Active Substances (MBAS)	mg/L	0.1	0.1	0.3
Nitrogen (Total)	mg/L	3.1	5.4	6.3
Oil and Grease	mg/L	0	2.5	7.5
pH	pH	7.6	7.4	7.6
Phosphorus (Total)	mg/L	0.1	0.1	0.1
Total Suspended Solids	mg/L	13.6	30	31.3

Thirty-eight samples (sample events) were collected and analysed during discharge in the 2018-19 reporting period. Twelve of these events returned results where water pollution limits noted in Table 30 were exceeded and were reported to the EPA and DPE (see Appendix I Water Quality Exceedances Notification). Appendix C displays the exceedance information for each event including sample date, pollutant compound and analysis result.

Upon receiving sample results from the laboratory, site investigations were undertaken in an attempt to determine potential pollutant sources contributing to the exceedances. This included upstream inspections (Structaflor and Highland Pine Products stormwater infrastructure), assessment of site activities and ERSED controls, and review of rainfall data. Site wide Alerts were issued in July 2018 prohibiting washing of hard surfaces and washing of plant/vehicles/equipment that use detergents. These Alerts focused on identified potential contributors to exceedances of oil, grease, nitrogen and MBAS.

Stormwater harvesting (averaged 118m3/day over the reporting period) is conducted under a business as usual scenario as this is an integral part of the current site operations and a fundamental component of the sites long-term operational plans, however additional harvesting was undertaken due to the exceedances experienced to manage off site discharge.

Borg engaged an environmental consultant to review the historical data for the period 13 June 2018 to 8 August 2018 due to the number of exceedances. For each pollutant listed in EPL 3035, historical data (2005 - 2018) was investigated and interrogated and concluded the following:

> Results of this study show Biological Oxygen Demand, Colour, Methylene Blue Active Substances, Total Nitrogen, Oil and Grease and Total Suspended Solids recorded non-compliance to EPL 3035 limits both historically and on multiple occasions during 2018. No breach of EPL 3035 was recorded during 2018 for Total Phosphorous*, Aldrin, Dieldrin or pH.
> It is likely the results for 2018 are driven by a combination of detergent use, onsite construction and excessive organic matter, such as pine resins, bark and woodchip and sediment accumulating in water storage and treatment facilities. These chemicals, activities and materials are likely to have caused high MBAS concentrations and generated fulvic and humic acids, discolored water, elevated organic nutrient loads and concentrations of non-petroleum based Hydrocarbons and raised Total Suspended Solids, all which may lead to higher Biological Oxygen Demand.

**Note that this study includes data to August 2018 and therefore does not report on the minor Total P exceedance recorded for February 2019 as shown in Appendix C.*

Upon receiving the advice, Borg Panels decided to vary the laboratory analysis for water samples taken at EPA Point 1 to include TRH and TPH with and without silica gel clean up to better understand water quality issues by determining the origin of material contributing to the exceedances. Subsequent results demonstrated that the source of oil and grease was not hydrocarbon based, more so from organic residue. Further, based on conclusions provided it can be surmised that the exceedances for the other listed pollutants are attributed to excessive organic matter and sediment accumulation within the stormwater system.

An incident report was prepared by Borg for these exceedances and submitted to the EPA on 5 October 2018.No comments were received from the EPA.

Following the 8 August 2018 sample event (last in the series of concurrent exceedances) 13 sample events were undertaken with nil exceedances reported. Between 10 December 2018 and 26 February 2019, six minor exceedances were recorded and reported to the EPA (see Appendix I) with the exception of a minor exceedance of BOD on 26 January 2019 (limit exceeded by 2mg/l). This was likely an oversight from Borg Panels. Whilst minor in nature, these exceedances were investigated which included site inspections, review of rainfall data and site activities. For each exceedance, no site contributors were identified.

4.5 Groundwater

In accordance with EPL 3035, Borg Panels monitor four groundwater bores on site. The locations of groundwater monitoring points are listed in Table 32.

Table 32 Location of Groundwater Monitoring Bores

EPA Identification No.	Location Description
14	North western boundary of site
15	East of stormwater treatment pond
16	East of Woodchem
24	North of western end of Spring dam

Samples were collected by an appropriately qualified third party specialist and analysed by NATA certified laboratories. This work is carried out in accordance with statutory requirements and relevant standards. Monitoring equipment is maintained in accordance with the manufacturer's specifications by qualified specialists.

Tables 33-36 present results for EPA Identification Points 14, 15, 16 and 24 during the reporting period and compares them with the previous two years data.

Table 33 Groundwater Monitoring Results EPA Identification Point 14 (GW05)

Pollutant	Unit of Measure	Frequency	2016/17	2017/18	2018/19
Aldrin	µg/L	Yearly	<0.5	<0.5	<0.5
Ammonia as N	mg/L	Yearly	0.06	0.23	0.02
Chemical Oxygen Demand	mg/L	Yearly	<10	<10	<10
Electrical Conductivity	µS/cm	Yearly	362	358	377
Dieldrin	µg/L	Yearly	<0.5	<0.5	<0.5
Formaldehyde	mg/L	Yearly	0.1	0.2	<0.1
pH	pH Units	Yearly	7.66	7.66	6.8
Total Dissolved Solids	mg/L	Yearly	188	220	180
Total Organic Carbon	mg/L	Yearly	1	1	<1
Total Petroleum Hydrocarbons	µg/L	Yearly	<50	<50	<50
Total Suspended Solids	mg/L	Yearly	31	31	13
Water Height	m	Yearly	6.53	7.3	6.7

Table 34 Groundwater Monitoring Results EPA Identification Point 15 (GW02)

Pollutant	Unit of Measure	Frequency	2016/17	2017/18	2018/19
Aldrin	µg/L	Yearly	<0.5	<0.5	<0.5
Ammonia as N	mg/L	Yearly	0.08	<0.01	0.03
Chemical Oxygen Demand	mg/L	Yearly	56	18	15
Electrical Conductivity	µS/cm	Yearly	1007	1035	1032
Dieldrin	µg/L	Yearly	<0.5	<0.5	<0.5
Formaldehyde	mg/L	Yearly	0.1	0.1	<0.1
pH	pH Units	Yearly	7.01	7.20	6.2
Total Dissolved Solids	mg/L	Yearly	714	618	500
Total Organic Carbon	mg/L	Yearly	6	4	4
Total Petroleum Hydrocarbons	µg/L	Yearly	<50	<50	<50
Total Suspended Solids	mg/L	Yearly	168	42	46
Water Height	m	Yearly	3.05	4.2	2.5

Table 35 Groundwater Monitoring Results EPA Identification Points 16 (GW01)

Pollutant	Unit of Measure	Frequency	2016/17	2017/18	2018/19
Aldrin	µg/L	Yearly	<0.5	<0.5	<0.5
Ammonia as N	mg/L	Yearly	0.04	0.03	0.04
Chemical Oxygen Demand	mg/L	Yearly	130	14	<10
Electrical Conductivity	µS/cm	Yearly	150	199	189
Dieldrin	µg/L	Yearly	<0.5	<0.5	<0.5
Formaldehyde	mg/L	Yearly	0.6	<0.1	<0.1
pH	pH Units	Yearly	7.31	6.8	6.6
Total Dissolved Solids	mg/L	Yearly	350	110	98
Total Organic Carbon	mg/L	Yearly	15	3	2
Total Petroleum Hydrocarbons	µg/L	Yearly	<50	<50	<50
Total Suspended Solids	mg/L	Yearly	410	415	73
Water Height	m	Yearly	1.66	1.0	0.9

Table 36 Groundwater Monitoring Results EPA Identification Points 24 (GW26)

Pollutant	Unit of Measure	Frequency	2016/17	2017/18	2018/2019
Aldrin	µg/L	Yearly	<0.5	<0.5	<0.5
Ammonia as N	mg/L	Yearly	0.05	0.01	0.03
Chemical Oxygen Demand	mg/L	Yearly	<10	12	<10
Electrical Conductivity	µS/cm	Yearly	376	400	244
Dieldrin	µg/L	Yearly	<0.5	<0.5	<0.5
Formaldehyde	mg/L	Yearly	0.1	<0.1	<0.1
pH	pH Units	Yearly	7.27	7.1	6.2
Total Dissolved Solids	mg/L	Yearly	228	284	142
Total Organic Carbon	mg/L	Yearly	2	1	1
Total Petroleum Hydrocarbons	µg/L	Yearly	<50	<50	<50
Total Suspended Solids	mg/L	Yearly	31	37	24
Water Height	m	Yearly	1.97	1.71	1.5

At EPA Point 14 (Table 33), majority of analytes tested during this review period did not differ significantly from previous review periods. Total Dissolved Solids and Total Suspended Solids results both show a decrease when compared with the 2017/18 records.

At EPA Point 15 (Table 34), a decrease in Total Dissolved Solids is evident from the previous review period with all other analytes similar to the 2017/18 period.

Results for EPA Point 16 (Table 35) show a significant decrease in Total Suspended Solids from the previous two review periods, with all other analytes remaining relatively constant with the 2017/18 records.

EPA Point 24 (Table 36) shows a significant decrease in Total Dissolved Solids when compared with the two previous review periods.

There are no concentration limits for groundwater set in EPL 3035. Laboratory analysis report provided by ALS Environmental is attached as Appendix D.

4.6 Noise

In accordance with EPL 3035 and site management plans, Borg Panels monitor noise emissions from the facility. Noise from the premises must not exceed the limits noted in Table 37. Furthermore, in accordance with Development Consent SSD 7016 all construction activities related to the development must also comply with the limits in Table 37.

Table 37 Noise Limits dB(A)

Location	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$	Night $L_{Aeq(15\ minute)}$
All sensitive receivers	55	50	45

Note: *Day* – The period from 7:00am to 6:00pm on Monday to Saturday, and 8:00am to 6:00pm on Sundays and Public Holidays
Evening – The period from 6:00pm to 10:00pm
Night – The period from 10:00pm to 7:00am on Monday to Saturday, and 10:00pm to 8:00am on Sundays and Public Holidays
L_{Aeq} means the equivalent continuous noise level – the level of noise equivalent the energy-average of noise levels occurring over a measurement period.

These noise limits apply under all meteorological conditions except for the following:

a) Wind speeds greater than 3 meters/second at 10 metres above ground level; or
b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
c) Stability category G temperature inversion conditions.

Data recorded by the meteorological station identified as EPA Identification Point 26 must be used to determine meteorological conditions. Temperature inversion conditions (stability category) are to be determined by the sigma-thetas method referred to in Part E4 of Appendix E to the *Industrial Noise Policy* (EPA, January 2000).

4.6.1 Operational Noise

EPL 3035 stipulates that noise monitoring to determine compliance must be carried out at least once annually during the day, evening and night time hours specified in Table 37. Noise monitoring must be undertaken in accordance with *Australian Standard AS 2659.1 (1998): Guide to use of sound measuring equipment – portable sound level meters*, and the compliance monitoring guidance provided in the *NSW Industrial Noise Policy*.

During the 2018-19 reporting period, Global Acoustics were engaged to conduct attended noise monitoring and provide an *Annual Noise Monitoring* report for operational noise generated by the Borg Panels facility. The noise monitoring event was conducted at four sensitive receiver locations as shown in Figure 6. Evening and night monitoring was undertaken on the 22nd August 2018, and day monitoring on the 23rd August 2018. Table 38 presents and compares results of the attended noise monitoring.

Figure 7 Borg Panels noise monitoring locations

Table 38 Attended Noise Monitoring $L_{Aeq(15\ minute)}$

Location	Start Date and time	Wind Speed m/s	Stability Class	VTG ˚C per 100m	Criterion dB	Criterion Applies	Borg $L_{Aeq(15\ min)}$	Exceedance
NM1	23/08/2018 10:16	4.9	B	-1.8	55	No	NM	NA
NM2	23/08/2018 10:41	3.4	B	-1.8	55	No	<45	NA
NM3	23/08/2018 09:24	4.0	B	-1.8	55	No	<30	NA
NM4	23/08/2018 09:48	4.2	C	-1.6	55	No	NM	NA
NM1	22/08/2018 20:10	1.6	F	3.0	50	Yes	<40	Nil
NM2	22/08/2018 20:38	1.8	F	3.0	50	Yes	NM	Nil
NM3	22/08/2018 19:25	1.7	D	-1.0	50	Yes	<40	Nil
NM4	22/08/2018 19:46	1.5	E	0.5	50	Yes	<30	Nil
NM1	22/08/2018 22:45	1.4	E	0.5	45	Yes	34	Nil
NM2	22/08/2018 22:25	1.7	E	0.5	45	Yes	NM	Nil
NM3	22/08/2018 23:31	0.8	E	0.5	45	Yes	<30	Nil
NM4	22/08/2018 23:07	1.2	E	0.5	45	Yes	IA	Nil

Note: -Atmospheric data sourced from the Borg Panels weather station
-NA = Not Applicable means atmospheric conditions outside conditions specified in Development Consent and so criterion is not applicable.
-NM = Not Measurable means some noise from the source of interest was audible at low levels, but could not be quantified.
-IA = Inaudible means there was no noise from the source of interest audible at the monitoring location.

The attended noise monitoring conducted by Global Acoustics recorded no exceedance of limits identified in Table 36. All measurements were undertaken as per *The Industrial Noise*

Policy (EPA, January 2000). The report was compiled by Global Acoustics for the annual noise monitoring is attached to this document as Appendix E.

4.6.2 Construction Noise

Borg Panels Construction Noise Management Plan (CNMP) includes for an attended monitoring regime of one event per quarter. Attended monitoring locations are shown in Figure 6. If any exceedances are identified, additional mitigation measures are implemented and follow-up monitoring undertaken within one week of the exceedance to determine the effectiveness of the additional controls. Global Acoustics conducted the construction noise monitoring for this review period. Tables 39, 40, 41 and 42 show monitoring results for quarters 2, 3, 4 and 1 respectively.

Table 39 Construction Noise Quarter 2

Location	Start Date and time	Wind Speed m/s	Stability Class	VTG °C per 100m	Criterion dB	Criterion Applies	Borg $L_{Aeq(15\ min)}$	Exceedance
NM1	24/05/2018 11:49	2.6	A	-2.0	55	Yes	NM	Nil
NM2	24/05/2018 11:29	3.1	B	-1.8	55	No	IA	NA
NM3	24/05/2018 12:35	3.1	B	-1.8	55	No	43	NA
NM4	24/05/2018 12:12	3.2	B	-1.8	55	No	<40	NA

Table 40 Construction Noise Quarter 3

Location	Start Date and time	Wind Speed m/s	Stability Class	VTG °C per 100m	Criterion dB	Criterion Applies	Borg $L_{Aeq(15\ min)}$	Exceedance
NM1	23/08/2018 10:16	4.9	B	-1.8	55	No	NM	NA
NM2	23/08/2018 10:41	3.4	B	-1.8	55	No	<45	NA
NM3	23/08/2018 09:24	4.0	B	-1.8	55	No	<30	NA
NM4	23/08/2018 09:48	4.2	C	-1.6	55	No	NM	NA

Table 41 Construction Noise Quarter 4

Location	Start Date and time	Wind Speed m/s	Stability Class	VTG °C per 100m	Criterion dB	Criterion Applies	Borg $L_{Aeq(15\ min)}$	Exceedance
NM1	14/11/2018 10:40	2.6	C	-1.6	55	Yes	45	Nil
NM2	14/11/2018 10:07	1.3	C	-1.6	55	Yes	47	Nil
NM3	14/11/2018 11:51	2.5	A	-2.0	55	Yes	30	Nil
NM4	14/11/2018 11:26	2.8	D	-1.0	55	Yes	45	Nil

Table 42 Construction Noise Quarter 1

Location	Start Date and time	Wind Speed m/s	Stability Class	VTG °C per 100m	Criterion dB	Criterion Applies	Borg $L_{Aeq(15\ min)}$	Exceedance
NM1	23/03/2019 12:33	1.3	A	-2.0	55	Yes	NM	Nil
NM2	23/03/2019 12:12	1.5	A	-2.0	55	Yes	NM	Nil
NM3	23/03/2019 11:26	1.6	A	-2.0	55	Yes	<35	Nil
NM4	23/03/2019 11:46	1.4	A	-2.0	55	Yes	<35	Nil

Note: -Atmospheric data was sourced from Borg Panels weather station.
-NA = Not Applicable means atmospheric conditions outside conditions specified in Development Consent and so criterion is not applicable.
-NM = Not Measurable means some noise from the source of interest was audible at low levels, but could not be quantified.
-IA = Inaudible, there was no noise from the source of interest audible at the monitoring location.

No exceedances were recorded during all four monitoring events. Reports provided by Global Acoustics for each quarter are attached to this document as Appendix F.

5 Community Relations

5.1 Environmental Complaints

Five noise related community complaints were received during the 2018/19 reporting period. Site investigations were conducted which included review of plant operation data and discussions with Area Managers/Supervisors regarding site activities to determine if the plant was operating within approved conditions as specified in SSD 7016 and EPL 3035. Attended and unattended noise monitoring was also conducted in response to the complaints.

Results of the investigations and review of noise monitoring data did not show any evidence of breach of licence or consent conditions. For each complaint received, Borg provided a response to the resident in a timely manner.

Regardless of our demonstration of compliance, Borg Panels will continue to undertake ad hoc attended and unattended noise monitoring to ensure nil noise nuisance to the local residents from site activities.

A summary of complaints received during the reporting period is provided in Appendix G.

5.2 Community Liaison

5.2.1 Community Consultative Committee (CCC)

Borg Panels has an established joint Community Consultative Committee (CCC) that meets nominally quarterly to discuss environmental and operational aspects of the facility and greater Oberon Timber Complex. During the reporting period, two CCC meetings were held on the following dates:

- 28 November 2018
- 20 March 2019

The CCC meetings provide a forum to discuss and address general construction and operational impacts, and mitigation measures for the Borg Panels facility. The CCC meetings also allow for feedback from the local community to Borg Panels in relation to the environmental performance of the facility. A copy of the Meeting Minutes are attached to this document as Appendix H.

The major discussion points relating to Borg Panels in 2018-19 were:

- Updates on safety, environment and production performance
- Ongoing focus on noise management
- General housekeeping commitments both on and off site (i.e. local roadways)
- Realise opportunities to participate in community events in the Oberon area such as Relay for Life

5.2.3 Opportunities for Information Exchange

Borg has in place the following avenues to register inquiries and complaints related to construction and operational activities:

- A 24-hour free call community liaison line (1800 802 795)

- Postal address for written complaints (Borg Panels, Private Mail Bag 1, Oberon NSW 2787)
- Email address for electronic complaints (oberon_site@borgs.com.au)

The telephone number, postal and email address are displayed on a sign at the entrance to the site in a position that is clearly visible to the public. This information is also distributed to the local community and is included in public information communications which may include Borg Panels website, local area advertisements, letterbox notifications and project fact sheets.

6 Environmental Incidents & Non-compliances

Environmental incidents are managed through the Borg Panels Pollution Incident Response Management Plan (PIRMP) and are logged in DataStation, Borg's incident management system. Each incident report details the issue, the corrective and preventative actions taken, and the responsibilities and timing for completion of the actions. The report also includes any additional comments relevant to the incident and the completion date of corrective actions.

6.1 Incidents

A pollution incident that requires notification is defined in section 147 of the Protection of the Environment Operations Act 1997 as:

(a) Harm to the environment is material if:
   i. It involves actual of potential harm to the health or safety of human beings or the ecosystems that is not trivial, or
   ii. If results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (or such other amount as is prescribed by the regulations),
   and

(b) Loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment.

During this reporting period, one reportable environmental incident occurred at the Borg Panels facility:

- Breach of containment – Firewater from hot oil room, 23 February 2019
  - Automatic fire suppression system at Particleboard activated at approximately 8:00pm as a result of smoke from a hot oil leak at an isolation valve.
  - Firewater breached primary and secondary containment with approximately 50m^3 entering the stormwater drain, a portion of the western swale adjacent the transformer yard. No firewater escaped site or entered the stormwater basin.
  - Fines and spill kit items were used to contain firewater and stop movement to swale.
  - Post incident: additional control installed (penstock gate) to stormwater infrastructure to isolate and contain firewater; activation sensor system was adjusted to deluge *only* where fire present; even though the room has a drainage channel, further bunding was installed at roller door to the hot oil room.

This incident was reported to the EPA in an email dated 26/02/2019. A copy of the email is attached to this document within Appendix J.

DataStation incident log is attached as Appendix K.

6.2 Non-conformances

Environmental non-conformances have been discussed in Section 4.4 of this Review and therefore have not been repeated in this section.

7 Activities Proposed for the next Annual Review Period

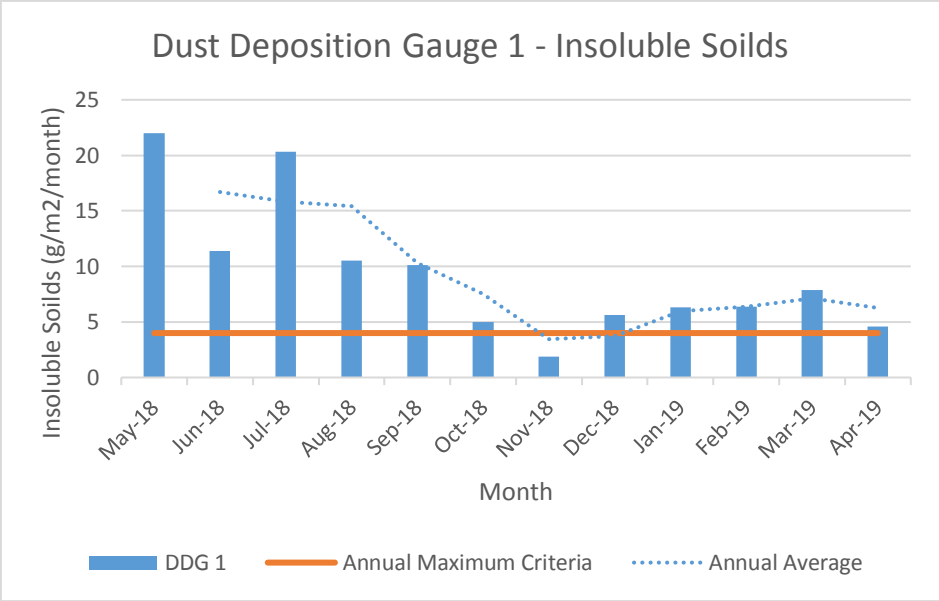
Borg Panels will endeavour to carry out the activities listed in Table 43 during the 2019-20 reporting period to assist with improving the environmental performance of the existing development and the project.

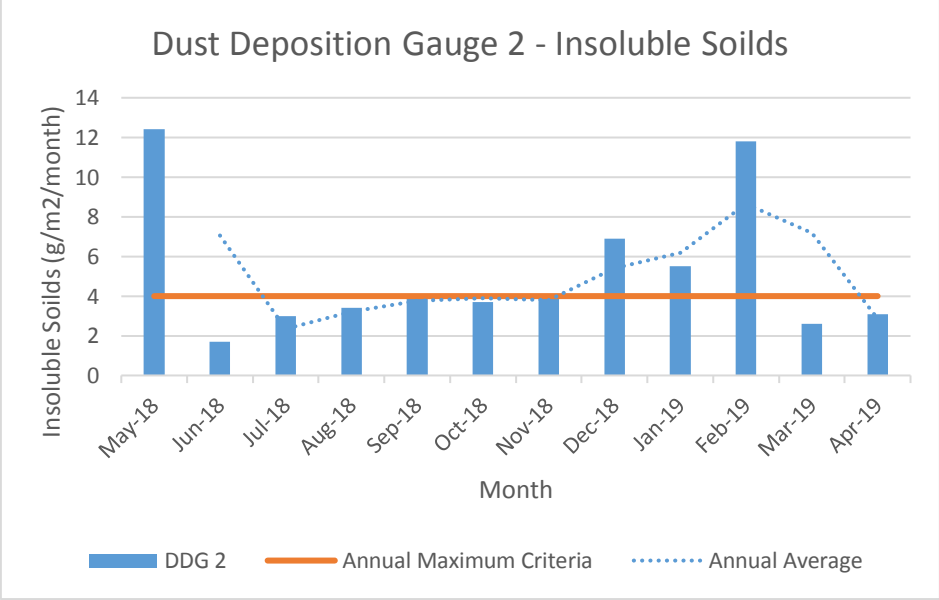
Table 43 Proposed Activities for 2019-20 Reporting Period

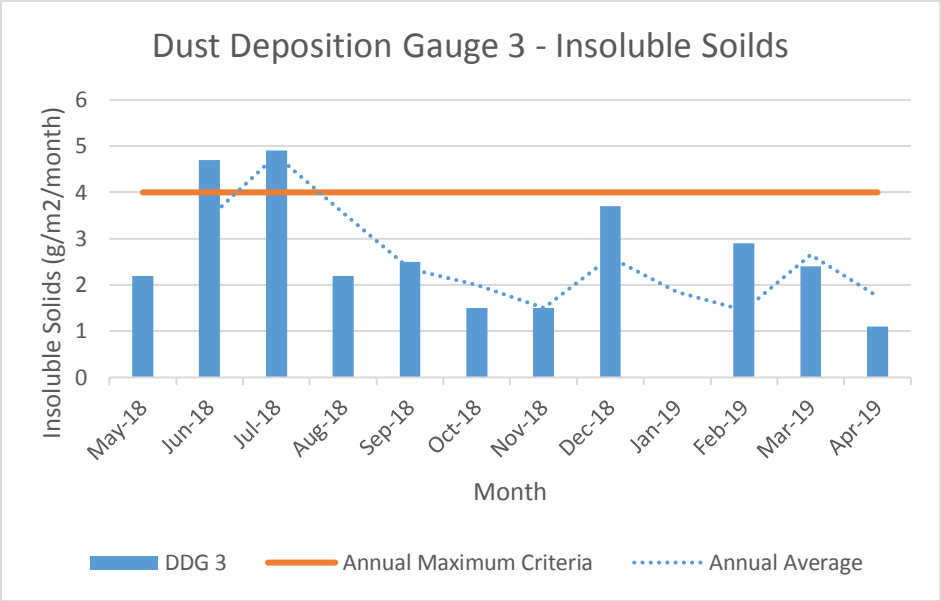
	Activities Proposed in 2019-20 Reporting Period
	Continue implementation of Environmental Management Plans for the existing development and the project.
	Deliver Environmental Awareness Training packages for Air and Waste.
	Complete commissioning of particleboard plant and related reporting
	Commission cogeneration units
	Complete landscaping works associated with the project.
	Complete connection of new sedimentation dam (i.e. swale) to allow discharge to unnamed creek (EPA Point 28).
	Continue with implementation of various management and mitigation measures as detailed in the development consent, including additional items provided in SSD 7016 MOD 1.
	Continue discussion with air quality consultant Todoroski Air Sciences regarding the pollution reduction program.
	Complete construction of building and associated infrastructure at the northern section of the site in accordance with SSD 7016 MOD 1.
	Submit S4.55 Modification for installation and operation of gas turbine generator set and ancillary infrastructure to DPE

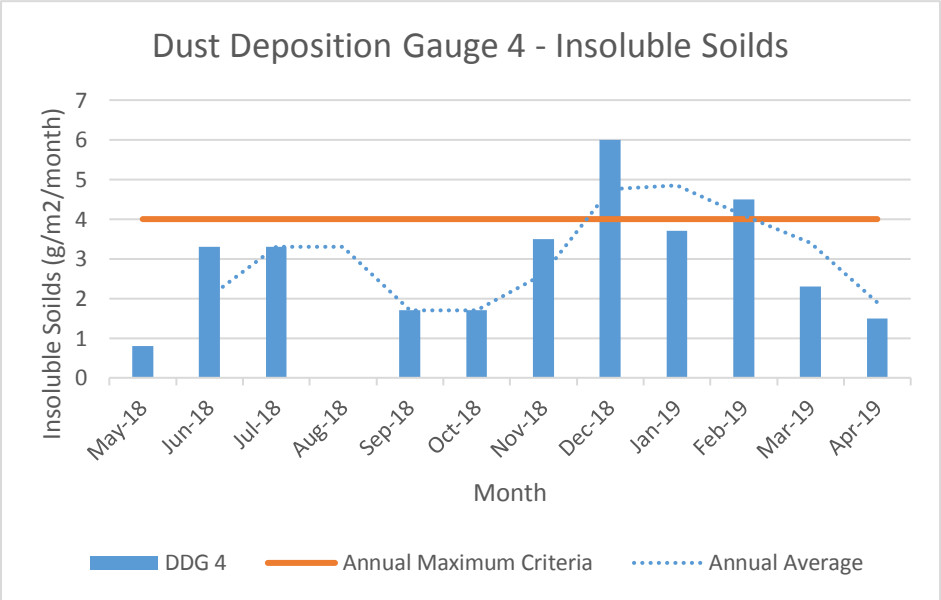
APPENDICIES

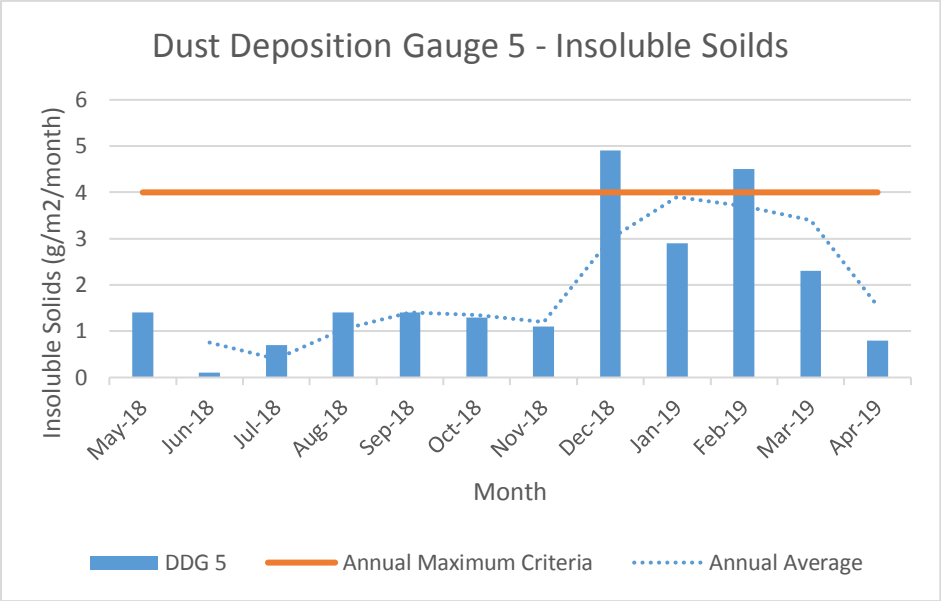
Appendix A – Depositional Dust Monitoring Data

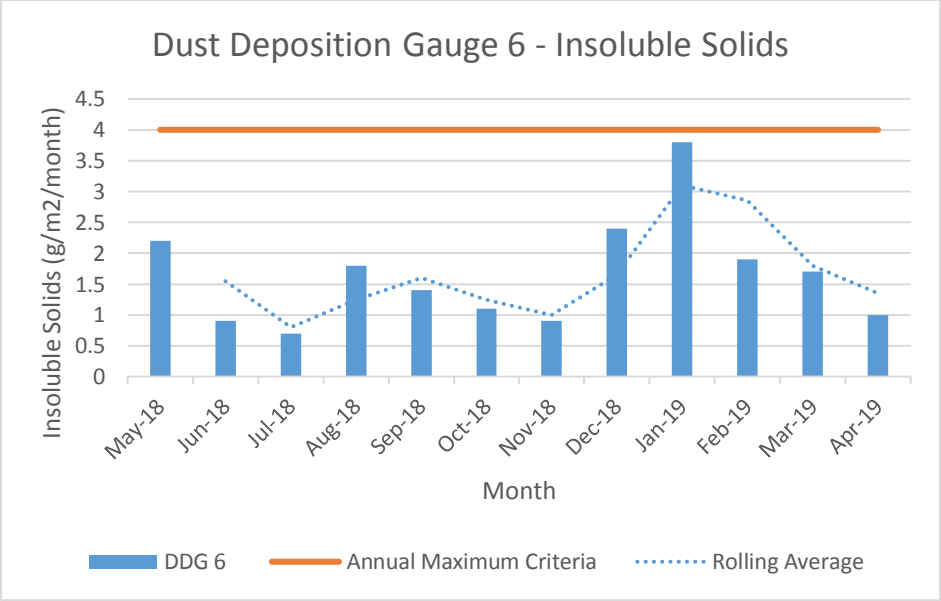

Dust Deposition Gauge 1 - Insoluble Soilds
Insoluble Soilds (g/m2/month)
25
20
15
10
5
0
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
Month
DDG 1
Annual Maximum Criteria
Annual Average


Dust Deposition Gauge 2 - Insoluble Soilds
Insoluble Soilds (g/m2/month)
14
12
10
8
6
4
2
0
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
Month
DDG 2
Annual Maximum Criteria
Annual Average


Dust Deposition Gauge 3 - Insoluble Soilds
Insoluble Solids (g/m2/month)
0
1
2
3
4
5
6
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
Month
DDG 3
Annual Maximum Criteria
Annual Average


Dust Deposition Gauge 4 - Insoluble Soilds
Insoluble Soilds (g/m2/month)
0
1
2
3
4
5
6
7
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
Month
DDG 4
Annual Maximum Criteria
Annual Average


Dust Deposition Gauge 5 - Insoluble Soilds
Insoluble Solids (g/m2/month)
0
1
2
3
4
5
6
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
Month
DDG 5
Annual Maximum Criteria
Annual Average


Dust Deposition Gauge 6 - Insoluble Solids
Insoluble Solids (g/m2/month)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
Month
DDG 6
Annual Maximum Criteria
Rolling Average

Appendix B – Air Quality Monitoring Data

Ektimo

Address (Head Office)
7 Redland Drive
MITCHAM VIC 3132

Postal Address
52 Cooper Road
COCKBURN CENTRAL WA 6164

Office Locations
VIC NSW WA QLD

Freecall: 1300 364 005
www.ektimo.com.au
ABN: 86 600 381 413

Report Number R007090

Emission Testing Report
Borg Manufacturing Pty Ltd, Oberon Plant

This document is confidential and is prepared for the exclusive use of Borg Manufacturing and those granted permission by Borg Manufacturing.

Document Information

Client Name:	Borg Manufacturing Pty Ltd
Report Number:	R007090
Date of Issue:	19 July 2019
Attention:	Victor Bendevski
Address:	Lowes Mount Rd Oberon NSW 2787
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Report Status

Format	Document Number	Report Date	Prepared By	Reviewed By (1)	Reviewed By (2)
Preliminary Report	-	-	-	-	-
Draft Report	R007090[DRAFT]	6/03/2019	JWe	ZPa	ADa
Final Report	R007090	19/07/2019	JWe	ZPa	ADa
Amend Report	-	-	-	-	-

Template Version: 171218

Amendment Record

Document Number	Initiator	Report Date	Section	Reason
Nil	-	-	-	-

Report Authorisation

Aaron Davis
Client Manager

NATA Accredited Laboratory
No. 14601

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

Table of Contents

1 EXECUTIVE SUMMARY

Ektimo was engaged by Borg Manufacturing to perform emissions to air monitoring as detailed below.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
EPA 4 - DC1 Baghouse	7 February 2019	Total solid particles, fine particulate matter (PM_{10}) Formaldehyde Smoke
EPA 5 - DC2 Baghouse		
EPA 7 - Conti 2 Stage 1 Dryer Cyclone 1 (West)	6 February 2019	Total solid particles, fine particulate matter (PM_{10}) Carbon dioxide, oxygen
EPA 8 - Conti 2 Stage 1 Dryer Cyclone 2 (East)		
EPA 9 - Conti 1 Stage 1 Dryer Cyclone 1 (South)	5 February 2019	Total solid particles, fine particulate matter (PM_{10}) Formaldehyde Nitrogen oxides, oxygen, carbon dioxide Volatile organic compounds Smoke
EPA 10 - Conti 1 Stage 1 Dryer Cyclone 2 (North)		
EPA 11 - Conti 2 Heat Plant Stack	6 February 2019	Total solid particles, fine particulate matter (PM_{10}) by particle size analysis (PSA) Formaldehyde Nitrogen oxides, carbon monoxide, carbon dioxide, oxygen Volatile organic compounds Smoke
EPA 27 - Combined Stack (C2 Press Vents)	7 February 2019	Total solid particles, fine particulate matter (PM_{10}) Formaldehyde Nitrogen oxides Volatile organic compounds Smoke

* Flow rate, velocity, temperature and moisture were also determined.

All results are reported on a dry basis at STP.

Plant operating conditions have been noted in the report.

2 LICENCE COMPARISON

The following licence comparison table shows that all analytes highlighted in green are below the licence limit set by the NSW EPA as per licence 3035 (last amended on 15 October 2018).

EPA No.	Location Description	Pollutant	Units	Licence limit	Detected values 5-6/02/19
9	Conti 1 Stage 1 Dryer Cyclone 1 (South)	Solid Particles	mg/m^3	200	21
		Volatile organic compounds	mg/m^3	10	5.5
10	Conti 1 Stage 1 Dryer Cyclone 2 (North)	Solid Particles	mg/m^3	200	28
		Volatile organic compounds	mg/m^3	10	8.2
11	Conti 2 Heat Plant Stack	Solid Particles	mg/m^3 @ 6.5% CO_2	200	140
		Volatile organic compounds	mg/m^3	10	0.4
		Formaldehyde	mg/m^3	5	0.34

3 RESULTS

3.1 EPA 4 – DC1 Baghouse

Date	7/02/2019	**Client**	Borg Manufacturing Pty Ltd
Report	R007090	**Stack ID**	EPA 4 - DC1 Baghouse
Licence No.	3035	**Location**	Oberon
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		*190201*

Sampling Plane Details	
Sampling plane dimensions	1280 x 680 mm
Sampling plane area	0.87 m²
Sampling port size, number	4" BSP (x2)
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Rectangular
Downstream disturbance	Exit 1 D
Upstream disturbance	Bend 3 D
No. traverses & points sampled	2 8
Sample plane compliance to AS4323.1	Compliant but non-ideal

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	4.5	
Gas molecular weight, g/g mole	28.5 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.30 (dry)
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1300 & 1412	
Temperature, °C	38	
Temperature, K	311	
Velocity at sampling plane, m/s	6.3	
Volumetric flow rate, actual, m³/s	5.5	
Volumetric flow rate (wet STP), m³/s	4.3	
Volumetric flow rate (dry STP), m³/s	4.1	
Mass flow rate (wet basis), kg/hour	20000	
Velocity difference, %	2	

Formaldehyde	Results	
Sampling time	1305-1405	
	Concentration mg/m³	Mass Rate g/min
Formaldehyde	2.8	0.68

Isokinetic Results	Results	
Sampling time	1305-1410	1305-1410 (PM10)
	Concentration mg/m³	Mass Rate g/min
Solid Particles	3.3	0.81
Fine particulates (PM10)	<5	<1
D50 cut size, 10µm	10.0	
Isokinetic Sampling Parameters	Isokinetic	PM 10
Sampling time, min	64	40
Isokinetic rate, %	100	103

Smoke Obscuration	Result
Time of assessment	1315 - 1330
Smoke Obscuration	0

3.2 EPA 5 – DC2 Baghouse

Date	7/02/2019	**Client**	Borg Manufacturing Pty Ltd
Report	R007090	**Stack ID**	EPA 5 - DC2 Baghouse
Licence No.	3035	**Location**	Oberon
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		190201

Sampling Plane Details	
Sampling plane dimensions	2800 x 680 mm
Sampling plane area	1.9 m²
Sampling port size, number	4" BSP (x2)
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Rectangular
Downstream disturbance	Exit 1 D
Upstream disturbance	Bend 3 D
No. traverses & points sampled	2 14
Sample plane compliance to AS4323.1	Compliant but non-ideal

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	4.4	
Gas molecular weight, g/g mole	28.6 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.30 (dry)
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1418 & 1535	
Temperature, °C	39	
Temperature, K	312	
Velocity at sampling plane, m/s	14	
Volumetric flow rate, actual, m³/s	27	
Volumetric flow rate (wet STP), m³/s	21	
Volumetric flow rate (dry STP), m³/s	20	
Mass flow rate (wet basis), kg/hour	97000	
Velocity difference, %	<1	

Formaldehyde	Results	
Sampling time	1425-1525	
	Concentration mg/m³	Mass Rate g/min
Formaldehyde	1.5	1.8

Isokinetic Results	Results	
Sampling time	1420-1531	1420-1531 (PM10)
	Concentration mg/m³	Mass Rate g/min
Solid Particles	3.1	3.7
Fine particulates (PM10)	<3	<3
D50 cut size, 10µm	10.0	
Isokinetic Sampling Parameters	Isokinetic	PM 10
Sampling time, min	70	70
Isokinetic rate, %	97	102

Smoke Obscuration	Result
Time of assessment	1435 - 1450
Smoke Obscuration	0

3.3 EPA 7 - Conti 2 Stage 1 Dryer Cyclone 1 (West)

Date	6/02/2019	**Client**	Borg Manufacturing Pty Ltd
Report	R007090	**Stack ID**	EPA 7 - Conti 2 Stage 1 Dryer Cyclone 1 (West)
Licence No.	3035	**Location**	Oberon
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		190201

Sampling Plane Details	
Sampling plane dimensions	2480 mm
Sampling plane area	4.83 m²
Sampling port size, number	4" BSP (x2)
Access & height of ports	Fixed ladder 35 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 1.5 D
Upstream disturbance	Junction 0.5 D
No. traverses & points sampled	2 24
Sample plane compliance to AS4323.1	Compliant but non-ideal

Comments

Please note that in response to the cyclonic flow, Borg Manufacturing has a NSW EPA approved method deviation to AS4323.2 to conduct particulate matter sampling at this location.

The sampling plane is deemed to be non-compliant or non-ideal due to the following reasons:

The gas profile has a cyclonic component which exceeds 15°

The upstream disturbance is <2D from the sampling plane

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

Stack Parameters		
Moisture content, %v/v	18	
Gas molecular weight, g/g mole	27.1 (wet)	29.1 (dry)
Gas density at STP, kg/m³	1.21 (wet)	1.30 (dry)
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0835 & 1042	
Temperature, °C	57	
Temperature, K	330	
Velocity at sampling plane, m/s	12	
Volumetric flow rate, actual, m³/s	58	
Volumetric flow rate (wet STP), m³/s	43	
Volumetric flow rate (dry STP), m³/s	35	
Mass flow rate (wet basis), kg/hour	190000	
Velocity difference, %	-2	

Gas Analyser Results	Average	Minimum	Maximum
Sampling time	0918 - 1017	0918 - 1017	0918 - 1017
Combustion Gases	Concentration %	Concentration %	Concentration %
Carbon dioxide	2.1	1.8	2.7
Oxygen	17	16.4	18.1

Isokinetic Results	Results	
Sampling time	840-1041	840-1041 (PM10)
	Concentration mg/m³	Mass Rate g/min
Solid Particles	43	89
Fine particulates (PM10)	36	75
D50 cut size, 10µm	9.3	
Isokinetic Sampling Parameters	Isokinetic	PM10
Sampling time, min	120	120
Isokinetic rate, %	106	95

3.4 EPA 8 - Conti 2 Stage 1 Dryer Cyclone 2 (East)

Date	6/02/2019	**Client**	Borg Manufacturing Pty Ltd
Report	R007090	**Stack ID**	EPA 8 - Conti 2 Stage 1 Dryer Cyclone 2 (East)
Licence No.	3035	**Location**	Oberon
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		190201

Sampling Plane Details	
Sampling plane dimensions	2480 mm
Sampling plane area	4.83 m²
Sampling port size, number	4" BSP (x2)
Access & height of ports	Fixed ladder 35 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 1.5 D
Upstream disturbance	Junction 0.5 D
No. traverses & points sampled	2 24
Sample plane compliance to AS4323.1	Compliant but non-ideal

Comments

Please note that in response to the cyclonic flow, Borg Manufacturing has a NSW EPA approved method deviation to AS4323.2 to conduct particulate matter sampling at this location.
Testing was suspended between 1155 and 1200 for temporary process downtime.

The sampling plane is deemed to be non-compliant or non-ideal due to the following reasons:
The gas profile has a cyclonic component which exceeds 15°
The upstream disturbance is <2D from the sampling plane
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

Stack Parameters		
Moisture content, %v/v	14	
Gas molecular weight, g/g mole	27.6 (wet)	29.3 (dry)
Gas density at STP, kg/m³	1.23 (wet)	1.31 (dry)
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1048 & 1300	
Temperature, °C	55	
Temperature, K	328	
Velocity at sampling plane, m/s	13	
Volumetric flow rate, actual, m³/s	65	
Volumetric flow rate (wet STP), m³/s	47	
Volumetric flow rate (dry STP), m³/s	41	
Mass flow rate (wet basis), kg/hour	210000	
Velocity difference, %	3	

Gas Analyser Results	Average	Minimum	Maximum
Sampling time	1051 - 1150	1051 - 1150	1051 - 1150
Combustion Gases	Concentration %	Concentration %	Concentration %
Carbon dioxide	2.5	2.2	2.8
Oxygen	18.3	18	18.6

Isokinetic Results	Results	
Sampling time	1050-1256	1050-1256 (PM10)
	Concentration mg/m³	Mass Rate g/min
Solid Particles	43	97
Fine particulates (PM10)	29	65
D50 cut size, 10µm	9.7	
Isokinetic Sampling Parameters	Isokinetic	PM10
Sampling time, min	120	120
Isokinetic rate, %	101	90

3.5 EPA 9 - Conti 1 Stage 1 Dryer Cyclone 1 (South)

Date	5/02/2019	**Client**	Borg Manufacturing Pty Ltd
Report	R007090	**Stack ID**	EPA 9 - Conti 1 Dryer Cyclone 1 (South)
Licence No.	3035	**Location**	Oberon
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		190201

Sampling Plane Details	
Sampling plane dimensions	2230 mm
Sampling plane area	3.91 m²
Sampling port size, number	4" BSP (x2)
Access & height of ports	Fixed ladder 25 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 1 D
Upstream disturbance	Junction 2 D
No. traverses & points sampled	2 24
Sample plane compliance to AS4323.1	Compliant but non-ideal

Comments

Please note that in response to the cyclonic flow, Borg Manufacturing has a NSW EPA approved method deviation to AS4323.2 to conduct particulate matter sampling at this location.

The sampling plane is deemed to be non-ideal due to the following reasons:

The gas profile has a cyclonic component which exceeds 15°

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	9.6	
Gas molecular weight, g/g mole	28.0 (wet)	29.1 (dry)
Gas density at STP, kg/m³	1.25 (wet)	1.30 (dry)
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1437 & 1645	
Temperature, °C	52	
Temperature, K	326	
Velocity at sampling plane, m/s	12	
Volumetric flow rate, actual, m³/s	46	
Volumetric flow rate (wet STP), m³/s	34	
Volumetric flow rate (dry STP), m³/s	31	
Mass flow rate (wet basis), kg/hour	150000	

Gas Analyser Results	Average		Minimum		Maximum	
Sampling time	1440 - 1539		1440 - 1539		1440 - 1539	
	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min
Combustion Gases						
Nitrogen oxides (as NO_2)	88	160	70	130	120	220
	Concentration %		Concentration %		Concentration %	
Carbon dioxide	1.3		1.1		1.4	
Oxygen	19.2		19		19.4	

Formaldehyde	Results	
Sampling time	1455-1555	
	Concentration mg/m³	Mass Rate g/min
Formaldehyde	4.8	8.8

Date	5/02/2019	**Client**	Borg Manufacturing Pty Ltd
Report	R007090	**Stack ID**	EPA 9 - Conti 1 Dryer Cyclone 1 (South)
Licence No.	3035	**Location**	Oberon
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		*190201*

Isokinetic Results	Results	
Sampling time	1440-1642	1440-1642 (PM10)
	Concentration mg/m³	Mass Rate g/min
Solid Particles	21	37
Fine particulates (PM10)	18	32
D50 cut size, 10µm	10.2	
Isokinetic Sampling Parameters	Isokinetic	PM10
Sampling time, min	120	120
Isokinetic rate, %	100	107
Velocity difference, %	<1	<1

Smoke Obscuration	Result
Time of assessment	1500 - 1515
Smoke Obscuration	0

Total VOCs (as n-Propane)	Results	
Lower Bound Sampling time	1500-1600	
	Concentration mg/m³	Mass Rate g/min
Total	5.5	10

VOC (speciated)	Results	
Sampling time	1500-1600	
	Concentration mg/m³	Mass Rate g/min
Detection limit[1]	<0.2	<0.4
α-Pinene	8.5	16
β-Pinene	6.8	13
D-Limonene	1.7	3.1

(1) Unless otherwise reported, the following target compounds were found to be below detection:
Ethanol, Isopropanol, Isobutanol, Butanol, 1-Methoxy-2-propanol, Cyclohexanol, 2-ButoxyethanolPentane, Hexane, Heptane, Octane, Nonane, Decane, Undecane, Dodecane, Tridecane, TetradecaneCyclohexane, 2-Methylhexane, 2,3-Dimethylpentane, 3-Methylhexane, Isooctane, Methylcyclohexane, alpha-Pinene, beta-Pinene, d-Limonene, 3-CareneAcetone, Methyl ethyl ketone, Ethyl acetate, Isopropyl acetate, Propyl acetate, MIBK, 2-Hexanone, Butyl acetate, 1-Methoxy-2-propyl acetate, Cyclohexanone, Cellosolve acetate, 2-Butoxyethyl acetate, Ethyldiglycol acetate, Diacetone alcohol, IsophoroneBenzene, Toluene, Ethylbenzene, m+p-Xylene, Styrene, o-Xylene, Isopropylbenzene, Propylbenzene, 1,3,5-Trimethylbenzene, alpha-Methylstyrene, tert-Butylbenzene, 1,2,4-Trimethylbenzene, 1,2,3-Trimethylbenzene, m-Diethylbenzene, o-Diethylbenzene, p-DiethylbenzeneDichloromethane, Chloroform, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Carbon tetrachloride, 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Trichloroethene, Tetrachloroethene, 1,1,2-Trichloroethane, 1,1,2,2-Tetrachloroethane, Chlorobenzene, Fluorobenzene

3.6 EPA 10 - Conti 1 Stage 1 Dryer Cyclone 2 (North)

Date	5/02/2019	**Client**	Borg Manufacturing Pty Ltd
Report	R007090	**Stack ID**	EPA 10 - Conti 1 Dryer Cyclone 2 (North)
Licence No.	3035	**Location**	Oberon
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		190201

Sampling Plane Details	
Sampling plane dimensions	2230 mm
Sampling plane area	3.91 m²
Sampling port size, number	4" BSP (x2)
Access & height of ports	Fixed ladder 25 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 1 D
Upstream disturbance	Junction 2 D
No. traverses & points sampled	2 24
Sample plane compliance to AS4323.1	Compliant but non-ideal

Comments

Please note that in response to the cyclonic flow, Borg Manufacturing has a NSW EPA approved method deviation to AS4323.2 to conduct particulate matter sampling at this location.

The sampling plane is deemed to be non-ideal due to the following reasons:

The gas profile has a cyclonic component which exceeds 15°

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	9.6	
Gas molecular weight, g/g mole	28.0 (wet)	29.1 (dry)
Gas density at STP, kg/m³	1.25 (wet)	1.30 (dry)
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1225 & 1435	
Temperature, °C	57	
Temperature, K	330	
Velocity at sampling plane, m/s	12	
Volumetric flow rate, actual, m³/s	46	
Volumetric flow rate (wet STP), m³/s	34	
Volumetric flow rate (dry STP), m³/s	31	
Mass flow rate (wet basis), kg/hour	150000	

Gas Analyser Results	Average		Minimum		Maximum	
Sampling time	1302 - 1401		1302 - 1401		1302 - 1401	
	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min
Combustion Gases						
Nitrogen oxides (as NO_2)	63	120	37	68	100	190
	Concentration %		Concentration %		Concentration %	
Carbon dioxide	1.3		1.1		1.4	
Oxygen	19.5		19.2		19.6	

Formaldehyde	Results	
Sampling time	1240-1340	
	Concentration mg/m³	Mass Rate g/min
Formaldehyde	4.9	9

Date	5/02/2019	**Client**	Borg Manufacturing Pty Ltd
Report	R007090	**Stack ID**	EPA 10 - Conti 1 Dryer Cyclone 2 (North)
Licence No.	3035	**Location**	Oberon
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		*190201*

Isokinetic Results	Results	
Sampling time	1230-1431	1230-1431 (PM10)
	Concentration mg/m³	Mass Rate g/min
Solid Particles	28	50
Fine particulates (PM10)	23	40
D50 cut size, 10µm	10.4	
Isokinetic Sampling Parameters	Isokinetic	PM10
Sampling time, min	120	120
Isokinetic rate, %	97	106
Velocity difference, %	<1	<1

Smoke Obscuration	Result
Time of assessment	1250 - 1305
Smoke Obscuration	0

Total VOCs (as n-Propane)	Results
Lower Bound Sampling time	1245-1345
	Concentration mg/m³ / Mass Rate g/min
Total	8.2 / 15

VOC (speciated)	Results	
Sampling time	1245-1345	
	Concentration mg/m³	Mass Rate g/min
Detection limit(1)	<0.2	<0.4
α-Pinene	13	24
β-Pinene	11	20
D-Limonene	1.7	3.2

(1) Unless otherwise reported, the following target compounds were found to be below detection:
Ethanol, Isopropanol, Isobutanol, Butanol, 1-Methoxy-2-propanol, Cyclohexanol, 2-ButoxyethanolPentane, Hexane, Heptane, Octane, Nonane, Decane, Undecane, Dodecane, Tridecane, TetradecaneCyclohexane, 2-Methylhexane, 2,3-Dimethylpentane, 3-Methylhexane, Isooctane, Methylcyclohexane, alpha-Pinene, beta-Pinene, d-Limonene, 3-CareneAcetone, Methyl ethyl ketone, Ethyl acetate, Isopropyl acetate, Propyl acetate, MIBK, 2-Hexanone, Butyl acetate, 1-Methoxy-2-propyl acetate, Cyclohexanone, Cellosolve acetate, 2-Butoxyethyl acetate, Ethyldiglycol acetate, Diacetone alcohol, IsophoroneBenzene, Toluene, Ethylbenzene, m+p-Xylene, Styrene, o-Xylene, Isopropylbenzene, Propylbenzene, 1,3,5-Trimethylbenzene, alpha-Methylstyrene, tert-Butylbenzene, 1,2,4-Trimethylbenzene, 1,2,3-Trimethylbenzene, m-Diethylbenzene, o-Diethylbenzene, p-DiethylbenzeneDichloromethane, Chloroform, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Carbon tetrachloride, 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Trichloroethene, Tetrachloroethene, 1,1,2-Trichloroethane, 1,1,2,2-Tetrachloroethane, Chlorobenzene, Fluorobenzene

3.7 EPA 11 - Conti 2 Heat Plant Stack

Date	6/02/2019	**Client**	Borg Manufacturing Pty Ltd
Report	R007090	**Stack ID**	EPA 11 - Conti 2 Heat Plant Stack
Licence No.	3035	**Location**	Oberon
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		190201

Sampling Plane Details	
Sampling plane dimensions	1500 mm
Sampling plane area	1.77 m²
Sampling port size, number	4" BSP (x2)
Access & height of ports	Elevated work platform 20 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 3 D
Upstream disturbance	Junction 3 D
No. traverses & points sampled	2 16
Sample plane compliance to AS4323.1	Compliant but non-ideal

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	7.2	
Gas molecular weight, g/g mole	28.9 (wet)	29.8 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.33 (dry)
% Carbon dioxide correction & Factor	6.5 %	0.95
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1525 & 1655	
Temperature, °C	296	
Temperature, K	569	
Velocity at sampling plane, m/s	6	
Volumetric flow rate, actual, m³/s	11	
Volumetric flow rate (wet STP), m³/s	4.5	
Volumetric flow rate (dry STP), m³/s	4.2	
Mass flow rate (wet basis), kg/hour	21000	

Gas Analyser Results	Average		Minimum		Maximum	
Sampling time	1555 - 1654		1555 - 1654		1555 - 1654	
	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min
Combustion Gases						
Nitrogen oxides (as NO_2)	550	140	420	100	600	150
Carbon monoxide	140	36	92	23	220	56
	Concentration %		Concentration %		Concentration %	
Carbon dioxide	6.9		5.2		8.4	
Oxygen	13.3		11.7		15.1	

Formaldehyde	Results	
Sampling time	1550-1650	
	Concentration mg/m³	Mass Rate g/min
Formaldehyde	0.34	0.085

Date	6/02/2019	**Client**	Borg Manufacturing Pty Ltd
Report	R007090	**Stack ID**	EPA 11 - Conti 2 Heat Plant Stack
Licence No.	3035	**Location**	Oberon
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		*190201*

Isokinetic Results		Results		
	Sampling time	1530-1652		
		Concentration mg/m³	Corrected to 6.5% CO2 mg/m³	Mass Rate g/min
Solid Particles		150	140	37
Fine particulates (PM10)	(PSA)	82	78	21
Isokinetic Sampling Parameters				
Sampling time, min		80		
Isokinetic rate, %		108		
Velocity difference, %		<1		

Smoke Obscuration	Result
Time of assessment	1620 - 1635
Smoke Obscuration	0

Total VOCs (as n-Propane)		Results	
Lower Bound	Sampling time	1550-1650	
		Concentration mg/m³	Mass Rate g/min
Total		0.4	0.1

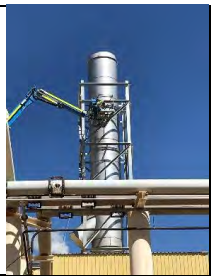
VOC (speciated)		Results	
	Sampling time	1550-1650	
		Concentration mg/m³	Mass Rate g/min
Detection limit[1]		<0.2	<0.05
Toluene		0.83	0.21

(1) Unless otherwise reported, the following target compounds were found to be below detection:
Ethanol, Isopropanol, Isobutanol, Butanol, 1-Methoxy-2-propanol, Cyclohexanol, 2-ButoxyethanolPentane, Hexane, Heptane, Octane, Nonane, Decane, Undecane, Dodecane, Tridecane, TetradecaneCyclohexane, 2-Methylhexane, 2,3-Dimethylpentane, 3-Methylhexane, Isooctane, Methylcyclohexane, alpha-Pinene, beta-Pinene, d-Limonene, 3-CareneAcetone, Methyl ethyl ketone, Ethyl acetate, Isopropyl acetate, Propyl acetate, MIBK, 2-Hexanone, Butyl acetate, 1-Methoxy-2-propyl acetate, Cyclohexanone, Cellosolve acetate, 2-Butoxyethyl acetate, Ethyldiglycol acetate, Diacetone alcohol, IsophoroneBenzene, Toluene, Ethylbenzene, m+p-Xylene, Styrene, o-Xylene, Isopropylbenzene, Propylbenzene, 1,3,5-Trimethylbenzene, alpha-Methylstyrene, tert-Butylbenzene, 1,2,4-Trimethylbenzene, 1,2,3-Trimethylbenzene, m-Diethylbenzene, o-Diethylbenzene, p-DiethylbenzeneDichloromethane, Chloroform, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Carbon tetrachloride, 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Trichloroethene, Tetrachloroethene, 1,1,2-Trichloroethane, 1,1,2,2-Tetrachloroethane, Chlorobenzene, Fluorobenzene

3.8 EPA 27 - Combined Stack (C2 Press Vents)

Date	7/02/2019	**Client**	Borg Manufacturing Pty Ltd
Report	R007090	**Stack ID**	EPA 27 - Combined Stack (C2 Press Vents)
Licence No.	3035	**Location**	Oberon
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		190201

Sampling Plane Details		
Sampling plane dimensions	2000 mm	
Sampling plane area	3.14 m²	
Sampling port size, number	4" BSP (x2)	
Access & height of ports	Elevated work platform	25 m
Duct orientation & shape	Vertical	Circular
Downstream disturbance	Exit	2.5 D
Upstream disturbance	Junction	4 D
No. traverses & points sampled	2	20
Sample plane compliance to AS4323.1	Compliant but non-ideal	



Comments

The sampling plane is deemed to be non-ideal due to the following reasons:

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	4.2	
Gas molecular weight, g/g mole	28.6 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.30 (dry)
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1040 & 1230	
Temperature, °C	36	
Temperature, K	309	
Velocity at sampling plane, m/s	9	
Volumetric flow rate, actual, m³/s	28	
Volumetric flow rate (wet STP), m³/s	22	
Volumetric flow rate (dry STP), m³/s	21	
Mass flow rate (wet basis), kg/hour	100000	

Gas Analyser Results	Average		Minimum		Maximum	
Sampling time	1057 - 1156		1057 - 1156		1057 - 1156	
	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min
Combustion Gases						
Nitrogen oxides (as NO_2)	<20	<30	<20	<30	<20	<30

Formaldehyde	Results	
Sampling time	1105-1205	
	Concentration mg/m³	Mass Rate g/min
Formaldehyde	2.1	2.6

Date	7/02/2019	**Client**	Borg Manufacturing Pty Ltd
Report	R007090	**Stack ID**	EPA 27 - Combined Stack (C2 Press Vents)
Licence No.	3035	**Location**	Oberon
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		*190201*

Isokinetic Results	Results	
Sampling time	1045-1227	1045-1227 (PM10)
	Concentration mg/m³	Mass Rate g/min
Solid Particles	5.3	6.7
Fine particulates (PM10)	2.2	2.8
D50 cut size, 10µm	10.0	
Isokinetic Sampling Parameters	Isokinetic	PM 10
Sampling time, min	100	100
Isokinetic rate, %	100	90
Velocity difference, %	<1	<1

Smoke Obscuration	Result
Time of assessment	1100 - 1115
Smoke Obscuration	0

Total VOCs (as n-Propane)	Results	
Lower Bound Sampling time	1105-1205	
	Concentration mg/m³	Mass Rate g/min
Total	0.66	0.84

VOC (speciated)	Results	
Sampling time	1105-1205	
	Concentration mg/m³	Mass Rate g/min
Detection limit[1]	<0.2	<0.2
Toluene	0.23	0.3
α-Pinene	0.9	1.1
β-Pinene	0.8	1

(1) Unless otherwise reported, the following target compounds were found to be below detection:
Ethanol, Isopropanol, Isobutanol, Butanol, 1-Methoxy-2-propanol, Cyclohexanol, 2-ButoxyethanolPentane, Hexane, Heptane, Octane, Nonane, Decane, Undecane, Dodecane, Tridecane, TetradecaneCyclohexane, 2-Methylhexane, 2,3-Dimethylpentane, 3-Methylhexane, Isooctane, Methylcyclohexane, alpha-Pinene, beta-Pinene, d-Limonene, 3-CareneAcetone, Methyl ethyl ketone, Ethyl acetate, Isopropyl acetate, Propyl acetate, MIBK, 2-Hexanone, Butyl acetate, 1-Methoxy-2-propyl acetate, Cyclohexanone, Cellosolve acetate, 2-Butoxyethyl acetate, Ethyldiglycol acetate, Diacetone alcohol, IsophoroneBenzene, Toluene, Ethylbenzene, m+p-Xylene, Styrene, o-Xylene, Isopropylbenzene, Propylbenzene, 1,3,5-Trimethylbenzene, alpha-Methylstyrene, tert-Butylbenzene, 1,2,4-Trimethylbenzene, 1,2,3-Trimethylbenzene, m-Diethylbenzene, o-Diethylbenzene, p-DiethylbenzeneDichloromethane, Chloroform, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Carbon tetrachloride, 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Trichloroethene, Tetrachloroethene, 1,1,2-Trichloroethane, 1,1,2,2-Tetrachloroethane, Chlorobenzene, Fluorobenzene

4 PLANT OPERATING CONDITIONS

Unless otherwise stated, the plant operating conditions were normal at the time of testing. See Borg Manufacturing's records for complete process conditions.

5 TEST METHODS

All sampling and analysis was performed by Ektimo unless otherwise specified. Specific details of the methods are available upon request.

Parameter	Sampling Method	Analysis Method	Uncertainty*	NATA Accredited	
				Sampling	Analysis
Sample plane criteria	NSW TM-1	NA	-	✓	NA
Flow rate, temperature and velocity	NSW TM-2	NA	8%, 2%, 7%	✓	NA
Moisture content	NSW TM-22	NSW TM-22	8%	✓	✓
Carbon dioxide	NSW TM-24	NSW TM-24	13%	✓	✓
Carbon monoxide	NSW TM-32	NSW TM-32	12%	✓	✓
Nitrogen oxides (NO_x)	NSW TM-11	NSW TM-11	12%	✓	✓
Oxygen	NSW TM-25	NSW TM-25	13%	✓	✓
Formaldehyde	NSW TM-34	Ektimo 330	16%	✓	✓†
Speciated volatile organic compounds (VOC's)	NSW TM-34	Ektimo 344	19%	✓	✓†
Total solid particles	NSW TM-15	NSW TM-15	5%	✓	✓
Particulate matter < 10µm (PM_{10})	NSW OM-5	NSW OM-5	6%	✓	✓
Particulate matter < 10µm (PM_{10}) by particle size analysis	-	HRL In-house	-	-	✗**
Smoke	NSW TM-16	NSW TM-16	not specified	✓	✓

180903

* Uncertainty values cited in this table are calculated at the 95% confidence level (coverage factor = 2)

† Analysis performed by Ektimo, NATA accreditation number 14601.
Laboratory analytical results were reported on 13 February 2019 in report number R007090-Aldehydes.
Laboratory analytical results were reported on 28 February 2019 in report number R007090_SVOCs.

** Analysis performed by HRL Technology using a Malvern Instruments Mastersizer laser particle size analyser. NATA Accreditation does not cover the performance of this service.

6 QUALITY ASSURANCE/QUALITY CONTROL INFORMATION

Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Unless otherwise stated test methods used are accredited with the National Association of Testing Authorities. For full details, search for Ektimo at NATA's website www.nata.com.au.

Ektimo is accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025 - Testing. ISO/IEC 17025 - Testing requires that a laboratory have adequate equipment to perform the testing, as well as laboratory personnel with the competence to perform the testing. This quality assurance system is administered and maintained by the Quality Director.

NATA is a member of APLAC (Asia Pacific Laboratory Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through the mutual recognition arrangements with both of these organisations, NATA accreditation is recognised worldwide.

7 DEFINITIONS

The following symbols and abbreviations may be used in this test report:

% v/v	Volume to volume ratio, dry or wet basis
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
APHA	American public health association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BSP	British standard pipe
CARB	Californian Air Resources Board
CEM	Continuous Emission Monitoring
CEMS	Continuous Emission Monitoring System
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
D_{50}	'Cut size' of a cyclone defined as the particle diameter at which the cyclone achieves a 50% collection efficiency ie. half of the particles are retained by the cyclone and half are not and pass through it to the next stage. The D_{50} method simplifies the capture efficiency distribution by assuming that a given cyclone stage captures all of the particles with a diameter equal to or greater than the D_{50} of that cyclone and less than the D_{50} of the preceding cyclone.
DECC	Department of Environment & Climate Change (NSW)
Disturbance	A flow obstruction or instability in the direction of the flow which may impede accurate flow determination. This includes centrifugal fans, axial fans, partially closed or closed dampers, louvres, bends, connections, junctions, direction changes or changes in pipe diameter.
DWER	Department of Water and Environmental Regulation (WA)
DEHP	Department of Environment and Heritage Protection (QLD)
EPA	Environment Protection Authority
FTIR	Fourier Transform Infra-red
ISC	Intersociety committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
Lower Bound	Defines values reported below detection as equal to zero.
Medium Bound	Defines values reported below detection are equal to half the detection limit.
NA	Not applicable
NATA	National Association of Testing Authorities
NIOSH	National Institute of Occupational Safety and Health
NT	Not tested or results not required
OM	Other approved method
OU	The number of odour units per unit of volume. The numerical value of the odour concentration is equal to the number of dilutions to arrive at the odour threshold (50% panel response).
PM_{10}	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 10 microns (µm).
$PM_{2.5}$	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microns (µm).
PSA	Particle size analysis
RATA	Relative Accuracy Test Audit
Semi-quantified VOCs	Unknown VOCs (those not matching a standard compound), are identified by matching the mass spectrum of the chromatographic peak to the NIST Standard Reference Database (version 14.0), with a match quality exceeding 70%. An estimated concentration will be determined by matching the integrated area of the peak with the nearest suitable compound in the analytical calibration standard mixture.
STP	Standard temperature and pressure. Gas volumes and concentrations are expressed on a dry basis at 0°C, at discharge oxygen concentration and an absolute pressure of 101.325 kPa, unless otherwise specified.
TM	Test Method
TOC	The sum of all compounds of carbon which contain at least one carbon to carbon bond, plus methane and its derivatives.
USEPA	United States Environmental Protection Agency
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
Vic EPA	Victorian Environment Protection Authority
VOC	Any chemical compound based on carbon with a vapour pressure of at least 0.010 kPa at 25°C or having a corresponding volatility under the particular conditions of use. These compounds may contain oxygen, nitrogen and other elements, but specifically excluded are carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
XRD	X-ray Diffractometry
Upper Bound	Defines values reported below detection are equal to the detection limit.

Appendix C – Surface Water Monitoring Data

EPL 3035 LIMIT	0.3µg/l	20mg/l	160 hazen	0.3µg/l	0.5mg/l	10mg/l	10mg/l	6.5-8.5 pH	0.3mg/l	50mg/l
DATE OF SAMPLE	Aldrin	BOD	True Colour	Dieldrin	MBAS	Total N	Oil & Grease	pH	Total P	TSS
13-JUN-18	<0.01	65	300	<0.01	0.9	10.7	11	7.43	0.18	48
20-JUN-18	<0.01	42	150	<0.01	0.8	8.6	11	7.01	0.1	25
4-JUL-18	<0.01	104	400	<0.01	1.2	13.6	26	7.86	0.2	58
11-JUL-18	<0.01	90	500	<0.01	2.8	10.3	15	7.62	0.26	28
25-JUL-18	<0.01	52	400	<0.01	1.2	10	17	7.28	0.18	27
1-AUG-18	<0.01	42	300	<0.01	0.8	8.9	17	7.22	0.04	42
8-AUG-18	<0.01	19	250	<0.01	0.8	6	7	7.61	0.08	64
16-AUG-18	<0.01	7	70	<0.01	0.1	5.8	<5	7.72	0.04	23
4-SEPT-18	<0.01	5	50	<0.01	0.1	4.3	6	8.05	0.07	17
19-SEPT-18	<0.01	6	80	<0.01	0.5	5.4	<5	7.78	0.02	18
27-SEPT-18	<0.01	2	75	<0.01	0.1	2.1	7	7.51	0.02	28
8-OCT-18	<0.01	2	75	<0.01	0.1	3.7	<5	7.8	0.06	18
11-OCT-18	<0.01	3	40	<0.01	0.1	4.6	<5	7.53	0.05	43
16-OCT-18	<0.01	2	60	<0.01	0.1	5.8	<5	7.58	0.1	31
24-OCT-18	<0.01	2	25	<0.01	0.1	8.2	<5	7.41	0.1	13
30-OCT-18	<0.01	2	75	<0.01	0.1	6	<5	7.77	0.06	13
5-NOV-18	<0.01	2	110	<0.01	0.2	4.2	<5	7.51	0.08	23
20-NOV-18	<0.01	3	110	<0.01	0.1	9.9	<5	7.74	0.1	19
26-NOV-18	<0.01	3	55	<0.01	0.1	3.9	<5	7.64	0.02	6
3-DEC-18	<0.01	3	50	<0.01	0.1	5	<5	7.49	0.1	27
10-DEC-18	<0.01	4	80	<0.01	0.1	5.2	19	7.7	0.1	17
17-DEC-18	<0.01	2	125	<0.01	0.1	7.1	<5	7.44	0.15	34
2-JAN-19	<0.01	3	80	<0.01	0.1	3.8	<5	7.56	0.2	50
7-JAN-19	<0.01	2	70	<0.01	0.1	2.6	7	7.35	0.12	30
14-JAN-19	<0.01	2	40	<0.01	0.1	5.5	<5	7.44	0.04	74
23-JAN-19	<0.01	7	60	<0.01	0.1	6.4	6	7.4	0.09	19
29-JAN-19	<0.01	22	90	<0.01	0.2	7.3	8	7.46	0.13	27
4-FEB-19	<0.01	6	80	<0.01	0.1	7.8	<5	7.53	0.208	50
11-FEB-19	<0.01	20	200	<0.01	0.2	6.7	<5	7.66	0.3	97
18-FEB-19	<0.01	11	50	<0.01	0.2	3.8	<5	7.33	0.06	39
26-FEB-19	<0.01	8	65	<0.01	0.2	6	<5	7.36	0.4	30
15-MAR-19	<0.01	7	65	<0.01	0.2	5.8	<5	7.7	0.23	22
19-MAR-19	<0.01	7	35	<0.01	0.2	4.7	5	6.98	0.1	29
27-MAR-19	<0.01	3	60	<0.01	0.1	3.8	<5	7.47	0.1	41
1-APR-19	<0.01	4	100	<0.01	0.2	3	8	7.55	0.26	16
9-APR-19	<0.01	3	50	<0.01	0.1	10	<5	7.5	0.09	24
16-APR-19	<0.01	2	100	<0.01	0.1	8.9	<5	7.64	0.11	10
29-APR-19	<0.01	3	40	<0.01	0.1	4.6	<5	7.69	0.06	8

Exceedance of EPL 3035 discharge limit

Appendix D – Ground Water Monitoring Data

BORG PANELS
Borg Panels Pty Ltd
ABN: 54 139 584 900
Lowes Mount Rd
Operon NSW 2787
Australia
Ph: 02 6339 6111
Fax: 02 6339 6220

ENVIRONMENT PROTECTION LICENCE 3035

2018 Groundwater Quality Monitoring

POLLUTANT	UNIT OF MEASURE	FREQUENCY	NO. OF SAMPLES COLLECTED AND ANALYSED	EPA POINT 14 (GW05)	EPA POINT 15 (GW02)	EPA POINT 16 (GW01)	EPA POINT 24 (GW26)
Aldrin	µg/L	Yearly	1	<0.5	<0.5	<0.5	<0.5
Ammonia as N	mg/L	Yearly	1	0.02	0.03	0.04	0.03
Chemical Oxygen Demand	mg/L	Yearly	1	<10	15	<10	<10
Electrical Conductivity	µS/cm	Yearly	1	377	1032	189	244
Dieldrin	µg/L	Yearly	1	<0.5	<0.5	<0.5	<0.5
Formaldehyde	mg/L	Yearly	1	<0.1	<0.1	<0.1	<0.1
pH	pH Units	Yearly	1	6.8	6.2	6.6	6.2
Total Dissolved Solids	mg/L	Yearly	1	180	500	98	142
Total Organic Carbon	mg/L	Yearly	1	<1	4	2	1
Total Petroleum Hydrocarbons	µg/L	Yearly	1	<50	<50	<50	<50
Total Suspended Solids	mg/L	Yearly	1	13	46	73	24

Appendix E – Operational Noise Monitoring Data

Borg Panels Facility

Annual Operational Noise Monitoring

Reporting Year 2018 - 2019

Prepared for

Borg Construction Pty Ltd

Global Acoustics

Noise and Vibration Analysis and Solutions

Global Acoustics Pty Ltd
PO Box 3115 | Thornton NSW 2322
Telephone +61 2 4966 4333
Email global@globalacoustics.com.au
ABN 94 094 985 734

Borg Panels Facility

Reporting Year 2018 - 2019
Annual Operational Noise Monitoring

Reference: 18296_R02
Report date: 4 September 2018

Prepared for

Borg Manufacturing Pty Ltd
124 Lowes Mount Road
Oberon 2787 NSW

Prepared by

Global Acoustics Pty Ltd
PO Box 3115
Thornton NSW 2322

Prepared:	Amanda Borserio Consultant	QA Review:	Robert Kirwan Consultant

Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire

EXECUTIVE SUMMARY

Global Acoustics was engaged by Borg Manufacturing Pty Ltd to undertake attended noise monitoring at sites around the Borg panel manufacturing facility (Borg) at Oberon, NSW.

The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Operational Noise Management Plan (ONMP).

Attended environmental noise monitoring described in this report was undertaken during the evening and night period on 22 August 2018 and the day period on 23 August 2018. There were 4 attended monitoring locations as listed in Table 1.1 and shown in Figure 1.

Attended monitoring was conducted in general accordance with Australian Standard AS 1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements.

Borg operations complied with the relevant noise limits during the annual survey at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

A low frequency noise assessment was carried out in accordance with the EPA's NPfI. Low frequency modifying factors, where applicable, did not result in any exceedances of Borg noise limits during the survey.

Global Acoustics Pty Ltd

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Appendices

1 INTRODUCTION

1.1 Background

Global Acoustics was engaged by Borg Manufacturing Pty Ltd to undertake attended noise monitoring at sites around the Borg panel manufacturing facility (Borg) at Oberon, NSW.

The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Operational Noise Management Plan (ONMP).

The ONMP recommends annual noise monitoring be conducted during the winter period, as this season represents the likely worst-case season due to temperature inversions.

Attended environmental noise monitoring described in this report was undertaken during the evening and night period on 22 August 2018 and the day period on 23 August 2018.

1.2 Monitoring Locations

There were 4 attended monitoring locations as listed in Table 1.1 and shown in Figure 1.

Table 1.1: ATTENDED MONITORING LOCATIONS

Report Descriptor	Monitoring Location
NM1	Oberon Caravan Park
NM2	Intersection of Pine Street and Herborn Street
NM3	127 Hazelgrove Road
NM4	Intersection of Tasman Street and Earl Street

Figure 1: Attended Noise Monitoring Locations

1.3 Terminology & Abbreviations

Some definitions of terms and abbreviations, which may be used in this report, are provided in Table 1.2.

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
L_A	The A-weighted root mean squared (RMS) noise level at any instant
L_{Amax}	The maximum A-weighted noise level over a time period or for an event
L_{A1}	The noise level which is exceeded for 1 per cent of the time
L_{A10}	The noise level which is exceeded for 10 percent of the time, which is approximately the average of the maximum noise levels
L_{A50}	The noise level which is exceeded for 50 per cent of the time
L_{A90}	The level exceeded for 90 percent of the time, which is approximately the average of the minimum noise levels. The L_{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes
L_{Amin}	The minimum A-weighted noise level over a time period or for an event
L_{Aeq}	The average noise energy during a measurement period
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise
SPL	Sound pressure level (SPL), fluctuations in pressure measured as 10 times a logarithmic scale, the reference pressure being 20 micropascals
Hertz (Hz)	Cycles per second, the frequency of fluctuations in pressure, sound is usually a combination of many frequencies together
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude. Estimated from wind speed and sigma theta data
IA	Inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
NM	Not Measurable. If site only noise is noted as NM, this means some noise from the source of interest was audible at low-levels, but could not be quantified
Day	This is the period 7:00am to 6:00pm
Evening	This is the period 6:00pm to 10:00pm
Night	This is the period 10:00pm to 7:00am

2 CONSENT AND CRITERIA

All monitoring reported in this document has been carried out in general accordance with the Development Consent (the Consent) dated 29 May 2017 (SSD 7016) and the ONMP.

2.1 Development Consent and Project Specific Criteria

The sections of the Consent relating to noise are reproduced in Appendix A.

Table 2 in Schedule B of the Consent outlines the day, evening and night period impact assessment criteria, which have been reproduced in Table 2.1 below.

Table 2.1: IMPACT ASSESSMENT CRITERIA

Location	Day $L_{Aeq,15minute}$ dB	Evening $L_{Aeq,15minute}$ dB	Night $L_{Aeq,15minute}$ dB
All sensitive receivers	55	50	45

As described in the Consent, noise generated by Borg is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy (INP), as follows:

- during rain and wind speeds greater than 3 metres/second at 10 metres above ground level; or
- stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- stability category G temperature inversion conditions.

2.2 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2018) was approved for use in NSW in October 2018, and supersedes the EPA's Industrial Noise Policy (INP, 2000). Assessment and reporting of modifying factors is to be carried out in accordance with Fact Sheet C of the NPfI.

NPfI modifying factors, as they are applicable to mining noise, are described in more detail below.

2.2.1 Tonality and Intermittent Noise

As defined in the NPfI:

> *Tonal noise contains a prominent frequency and is characterised by a definite pitch.*
>
> *Intermittent noise is noise where the level suddenly drops/increases several times during the assessment period, with a noticeable change in source noise level of at least 5 dB(A); for example, equipment cycling on and off. The intermittency correction is not intended to be applied to changes in noise level due to meteorology.*

There were no intermittent noise sources from site during the survey. In addition, there is no equipment on site that is likely to generate tonal noise as defined in the NPfI.

2.2.2 Low Frequency Noise

As defined in the NPfI:

> *Low frequency noise is noise with an unbalanced spectrum and containing major components within the low-frequency range (10 – 160 Hz) of the frequency spectrum.*

The NPfI contains the current method of assessing low frequency noise, which is a 2 step process as detailed below:

> *Measure/assess source contribution C-weighted and A-weighted L_{eq},T levels over the same time period. The low frequency noise modifying factor correction is to be applied where the C-A level is 15 dB or more and:*
>
> - *where any of the 1/3 octave noise levels in Table C2 are exceeded by **up to and including** 5 dB and cannot be mitigated, a 2 dBA positive adjustment to measured A weighted levels applies for the evening/night period; and*
>
> - *where any of the 1/3 octave noise levels in Table C2 are exceeded by **more than** 5 dB and cannot be mitigated, a 5 dBA positive adjustment to measured A weighted levels applies for the evening/night period and a 2 dBA positive adjustment applies for the daytime period.*

Table C2 and associated notes from the NPfI is reproduced below:

Table C2: One-third octave low-frequency noise thresholds.

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

Notes:

- dB(Z) = decibel (Z frequency weighted).
- For the assessment of low-frequency noise, care should be taken to select a wind screen that can protect the microphone from wind-induced noise characteristics at least 10 dB below the threshold values in Table C2 for

wind speeds up to 5 metres per second. It is likely that high performance larger diameter wind screens (nominally 175 mm) will be required to achieve this performance (Hessler, 2008). In any case, the performance of the wind screen and wind speeds at which data will be excluded needs to be stated.

- Low-frequency noise corrections only apply under the standard and/or noise-enhancing meteorological conditions.
- Where a receiver location has had architectural acoustic treatment applied (including alternative means of mechanical ventilation satisfying the Building Code of Australia) by a proponent, as part of consent requirements or as a private negotiated agreement, alternative external low-frequency noise assessment criteria may be proposed to account for the higher transmission loss of the building façade.
- Measurements should be made between 1.2 and 1.5 metres above ground level unless otherwise approved through a planning instrument (consent/approval) or environment protection licence, and at locations nominated in the development consent or licence.

3 METHODOLOGY

3.1 Overview

All noise monitoring was conducted at locations representative of the nearest residences in accordance with Australian Standard AS1055 ' Acoustics, Description and Measurement of Environmental Noise', the Consent, ONMP and relevant NSW EPA requirements.

Meteorological data was obtained from the Borg weather station in Oberon. This data allowed correlation of atmospheric parameters and measured noise levels. Atmospheric condition measurement at ground level was also undertaken during attended monitoring.

3.2 Attended Noise Monitoring

Attended monitoring is preferred to the use of noise loggers when determining compliance with prescribed limits as it allows the most accurate determination of the contribution, if any, to measured noise levels by the source of interest, in this case Borg. The duration of each individual measurement was 15 minutes.

If the exact contribution of the source of interest cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise levels, for example, L_{A10}, L_{A50} or L_{A90}. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also be used in this report. When site noise is noted as IA, no site noise was audible at the monitoring location. When site noise is noted as NM, this means some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods as per the NPfI (e.g. measure closer and back calculate) to determine a value for reporting.

Therefore, all sites noted as NM in this report are due to one or more of the following reasons:

- site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- it was not feasible or reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, rough terrain preventing closer measurement, addition/removal of significant source to receiver shielding caused by moving closer, and meteorological conditions where back calculation may not be accurate.

3.3 Modifying Factors

Years of monitoring have indicated that noise levels from the facility, particularly those measured at significant distances from the source are relatively continuous and broad spectrum. Given this, noise levels from Borg at the monitoring locations are unlikely to be intermittent or tonal.

Assessment of low-frequency modifying factors is necessary when application of the maximum correction could potentially result in an exceedance of the relevant site-only L_{Aeq} criterion. Low-frequency analysis is therefore undertaken for measurements in this report where:

- meteorological conditions resulted in criteria being applicable;
- contributions from Borg were audible and directly measurable, such that the site-only L_{Aeq} was not "NM" or less than a maximum cut off value (e.g. "<20 dB" or "<30dB");
- contributions from Borg were within 5 dB of the relevant L_{Aeq} criterion, as 5 dB is the maximum penalty that can be applied by low-frequency modifying factors; and
- Borg was the dominant low-frequency noise source.

All measurements meeting these conditions were evaluated for possible low frequency penalty applicability in accordance with the NPfI.

3.4 Monitoring Equipment

The equipment used to measure environmental noise levels is detailed in Table 3.1. Calibration certificates are provided in Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level analyser	701424	05/06/2019
Pulsar 106 acoustic calibrator	74813	05/06/2019

4 RESULTS

4.1 Attended Noise Monitoring

Total noise levels measured at each location are provided in Table 4.1.

Table 4.1: MEASURED NOISE LEVELS – ANNUAL 2018 - 2019[1]

Location	Start Date and Time	L_{Amax} dB	L_{A1} dB	L_{A10} dB	L_{A50} dB	L_{Aeq} dB	L_{A90} dB	L_{Amin} dB
NM1	23/08/2018 10:16	80	67	61	54	58	51	46
NM2	23/08/2018 10:41	72	59	50	47	50	45	43
NM3	23/08/2018 09:24	65	60	47	38	46	34	30
NM4	23/08/2018 09:48	75	66	52	42	53	39	35
NM1	22/08/2018 20:10	63	51	43	38	42	36	34
NM2	22/08/2018 20:38	57	48	41	38	40	37	36
NM3	22/08/2018 19:25	62	58	44	41	44	40	38
NM4	22/08/2018 19:46	42	35	31	29	29	27	26
NM1	22/08/2018 22:45	46	42	39	34	36	33	31
NM2	22/08/2018 22:25	52	49	40	37	39	35	33
NM3	22/08/2018 23:31	38	32	30	26	28	24	23
NM4	22/08/2018 23:07	44	39	31	24	28	22	21

Notes: 1. Levels in this table are not necessarily the result of activity at Borg.

Table 4.2 compares measured $L_{Aeq,15minute}$ levels from Borg with the Consent and ONMP noise criteria.

Table 4.2: $L_{Aeq,15minute}$ GENERATED BY BORG AGAINST CRITERIA – ANNUAL 2018 - 2019

Location	Start Date and Time	Wind Speed m/s[1]	Stability Class[1]	VTG °C per 100m[1]	Criterion dB	Criterion Applies?[2,3]	Borg $L_{Aeq,15min}$ dB[4]	Exceedance [5,6]
NM1	23/08/2018 10:16	4.9	B	-1.8	55	No	NM	NA
NM2	23/08/2018 10:41	3.4	B	-1.8	55	No	<45	NA
NM3	23/08/2018 09:24	4.0	B	-1.8	55	No	<30	NA
NM4	23/08/2018 09:48	4.2	C	-1.6	55	No	NM	NA
NM1	22/08/2018 20:10	1.6	F	3.0	50	Yes	<40	Nil
NM2	22/08/2018 20:38	1.8	F	3.0	50	Yes	NM	Nil
NM3	22/08/2018 19:25	1.7	D	-1.0	50	Yes	<40	Nil
NM4	22/08/2018 19:46	1.5	E	0.5	50	Yes	<30	Nil
NM1	22/08/2018 22:45	1.4	E	0.5	45	Yes	34	Nil
NM2	22/08/2018 22:25	1.7	E	0.5	45	Yes	NM	Nil
NM3	22/08/2018 23:31	0.8	E	0.5	45	Yes	<30	Nil
NM4	22/08/2018 23:07	1.2	E	0.5	45	Yes	IA	Nil

Notes:

1. *Atmospheric data is sourced from Borg weather station in Oberon;*
2. *In accordance with EPL and PA, the noise criteria are to apply under all meteorological conditions except the following:*
   - *Wind speeds greater than 3 m/s at 10 metres above ground level; or*
   - *Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or*
   - *Stability class G temperature inversion conditions.*
3. *Criterion may or may not apply due to rounding of meteorological data values;*
4. *Estimated or measured $L_{Aeq,15minute}$ attributed to the Borg;*
5. *Bold results in red indicate exceedance of criteria (if applicable); and*
6. *NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable*

4.2 Modifying Factors

Measured Borg only levels were assessed for the applicability of low frequency modification factors in accordance with the EPA's NPfI.

There were no intermittent or tonal noise sources, as defined in the NPfI, audible from site during the survey. None of the measurements satisfied the conditions outlined in Section 3.3 when assessing low frequency noise.

Therefore no further assessment of modifying factors was undertaken.

4.3 Atmospheric Conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.3. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain or hail.

Table 4.3: MEASURED ATMOSPHERIC CONDITIONS – ANNUAL 2018 - 2019[1,2]

Location	Start Date and Time	Temperature (degrees)	Wind Speed (m/s)	Wind Direction	Cloud Cover (1/8s)
NM1	23/08/2018 10:16	7	2.2	60	7
NM2	23/08/2018 10:41	9	1.0	80	7
NM3	23/08/2018 09:24	7	0.4	160	5
NM4	23/08/2018 09:48	10	3.0	100	6
NM1	22/08/2018 20:10	7	0.0	-	8
NM2	22/08/2018 20:38	6	0.0	-	8
NM3	22/08/2018 19:25	10	0.2	200	8
NM4	22/08/2018 19:46	6	0.0	-	8
NM1	22/08/2018 22:45	6	0.0	-	8
NM2	22/08/2018 22:25	6	0.0	-	8
NM3	22/08/2018 23:31	5	0.0	-	8
NM4	22/08/2018 23:07	6	0.0	-	8

Notes:

1. *Wind speed and direction measured at 1.8 metres; and*
2. *"-" indicates calm conditions at 1.8 metres.*

5 SUMMARY

The following applies to attended noise monitoring conducted during the evening and night period on 22 August 2018 and the day period on 23 August 2018.

Borg operations complied with the relevant criteria during the annual survey at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

A low frequency noise assessment was carried out in accordance with the EPA's NPfI. Low frequency modifying factors, where applicable, did not result in any exceedances of Borg noise limits during the survey.

Global Acoustics Pty Ltd

APPENDIX

A STATUTORY REQUIREMENTS

A.1 BORG PANELS FACILITY DEVELOPMENT CONSENT

NOISE

Hours of Work

B13. The Applicant must comply with the hours detailed in **Table 1**, unless otherwise agreed in writing by the Secretary.

Table 1: Hours of Work

Activity	Day	Time
Earthworks and Construction	Monday – Friday Saturday	7 am to 7 pm 8 am to 1 pm
Operation	Monday – Sunday	24 hours

B14. Works outside of the hours identified in Condition B13 may be undertaken in the following circumstances:
(a) works that are inaudible at the nearest sensitive receivers;
(b) works agreed to in writing by the Secretary;
(c) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or
(d) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

Construction Noise Management Plan

B15. The Applicant must prepare a Construction Noise Management Plan (CNMP) for the Project to manage construction noise. The plan must form part of the CEMP required by Condition C1 and must:
(a) be prepared by a suitably qualified and experienced noise expert;
(b) be approved by the Secretary prior to the commencement of construction of the Project;
(c) describe procedures for achieving the noise limits in **Table 2**;
(d) describe the measures to be implemented to manage noisy works such as rock/concrete breaking activities, in close proximity to sensitive receivers;
(e) include strategies that have been developed with the community for managing noisy works;
(f) describe the community consultation undertaken to develop the strategies in e) above; and
(g) include a complaints management system that would be implemented for the duration of the Project.

Operational Noise Limits

B16. The Applicant must ensure that noise generated by the Development does not exceed the noise limits in **Table 2.**

Table 2: Noise Limits dB(A)

Location	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$	Night $L_{Aeq(15\ minute)}$
All sensitive receivers	55	50	45

Note: *Noise generated by the Development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.*

Noise Mitigation

B17. The Applicant must ensure all noise attenuation measures already installed for the Existing Development are maintained in good working order for the life of the Development.

Operational Noise Management Plan

B18. Within 6 months of the date of this consent, the Applicant must prepare an Operational Noise Management Plan (ONMP) for the Existing Development, to manage operational noise to the satisfaction of the Secretary. The ONMP must form part of the OEMP required by Condition C4 and be prepared in accordance with Condition C9. The ONMP must:
(a) be prepared by a suitably qualified and experienced noise expert;
(b) describe the measures that will be implemented to minimise noise from the Existing Development including:
(i) all reasonable and feasible measures being employed on site;
(ii) maintain equipment to ensure it is in good order;
(iii) traffic noise is effectively managed;
(iv) the noise impacts of the Existing Development are minimised during any meteorological conditions when the noise criteria in this consent do not apply;
(v) compliance with the relevant conditions of this consent;
(c) includes a noise monitoring program that:
(i) must be carried out until otherwise agreed to in writing by the Secretary;
(ii) is capable of evaluating the performance of the Existing Development; and
(iii) includes a protocol for determining exceedances of the relevant conditions of this consent and responding to complaints; and
(d) include a procedure for implementing noise mitigation measures, should the Applicant be directed by the EPA or the Secretary, or should non-compliances be detected.

B19. Prior to the commencement of operation of the Project, the Applicant must update the ONMP required under Condition B18, to incorporate the Project and its management, to the satisfaction of the Secretary. The updated plan must be prepared in accordance with the requirements of Condition B18, and must incorporate the following:
(a) description of the noise monitoring program to measure the performance of the Development against this consent and the EPL; and
(b) description of any additional measures that would be implemented for the Development to ensure compliance with the noise limits in Condition B16 and the EPL.

Noise Verification

B20. Within 3 months of commencement of operation of the Project, the Applicant must undertake a noise verification study for the Development to the satisfaction of the Secretary. The study must:
(a) be undertaken by a suitably qualified expert;
(b) include an analysis of compliance with noise limits specified in Condition B16;
(c) demonstrate achievement of the sound power levels in Table 12 of the *Borg Panels Timber Panel Processing Facility Noise and Vibration Impact Assessment*, dated May 2016 and prepared by Global Acoustics;
(d) include an outline of management actions to be taken to address any exceedances of the limits specified in Condition B16; and
(e) describe the contingency measures in the event management actions are not effective in reducing noise levels to an acceptable level.

Within 1 month of completing the study, the Applicant must submit a report outlining the findings of the study to the Secretary and the EPA.

B21. Should the noise verification study indicate the Development has not complied with the noise limits in Condition B16 and applicable EPL requirements, or where the verification indicates that greater impacts than predicted in the EIS may arise, a detailed investigation and an outline of any management measures necessary to prevent exceedances must be submitted to the Secretary and the EPA, as part of the study.

Borg will implement reasonable and practical measures to avoid or minimise impacts to the environment that may arise as a result of the project.

Borg will carry out the proposed works in accordance with the EIS, RTS and the approval conditions.

Noise

Attenuation, as detailed in the NIA, will be implemented as follows:

- Conti 1 Dryer Fan air intake redesigned and the fan speed reduced to minimise noise generated. A sound power reduction from LAeq 121 dB to 114 dB or better is required.
- Booster fan will receive additional insulation and a reduction in fan speed. A sound power reduction from LAeq 116 dB to 109 dB or better is required.
- Main fibre transport fan will have a concrete enclosure constructed around it. A sound power reduction from LAeq 110 dB to 104 dB or better is required.

In short, the approach taken by Borg to mitigate noise is based on a number of factors:

1. Continuation of the use of mobile chippers (that is, not to enclose the mobile chippers). However, these are backup items (only to be used when enclosed, electric chippers are not operational), and will not be used in enhancing met conditions.
2. Implementation of additional noise mitigation measures to minimise noise generated by equipment, as detailed above.
3. Provision of sound attenuation structures and enclosures to other equipment where appropriate.

Irrespective of the above, Borg undertakes to meet the existing plant sound power reductions specified in the NIA. If the proposed attenuation measures to the existing plant are found to be insufficient in achieving these reductions, additional works will be undertaken.

APPENDIX

B CALIBRATION CERTIFICATES

Acoustic Research Labs Pty Ltd
Level 7 Building 2 423 Pennant Hills Rd
Pennant Hills NSW AUSTRALIA 2120
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3.2013
Calibration Certificate

Calibration Number C17248

Client Details	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
Equipment Tested/ Model Number :	Rion NA-28
Instrument Serial Number :	00701424
Microphone Serial Number :	01916
Pre-amplifier Serial Number :	01463

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	24.3°C	**Ambient Temperature :**	24.4°C
Relative Humidity :	40%	**Relative Humidity :**	39.5%
Barometric Pressure :	100.05kPa	**Barometric Pressure :**	100kPa

Calibration Technician :	Vicky Jaiswal	**Secondary Check:**	Nick Williams
Calibration Date :	05/06/2017	**Report Issue Date :**	06/06/2017

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*Pass*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	*±0.16dB*	*Temperature*	*±0.05°C*
12.5kHz	*±0.2dB*	*Relative Humidity*	*±0.46%*
16kHz	*±0.29dB*	*Barometric Pressure*	*±0.017kPa*
Electrical Tests			
31.5 Hz to 20 kHz	*±0.12dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

NATA
WORLD RECOGNISED ACCREDITATION

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

PAGE 1 OF 1

Acoustic Research Labs Pty Ltd
Level 7 Building 2 423 Pennant Hills Rd
Pennant Hills NSW AUSTRALIA 2120
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Calibrator
IEC 60942-2004
Calibration Certificate

Calibration Number C17249

Client Details Global Acoustics Pty Ltd
12/16 Huntingdale Drive
Thornton NSW 2322

Equipment Tested/ Model Number : Pulsar 106
Instrument Serial Number : 74813

Atmospheric Conditions
Ambient Temperature : 24.3°C
Relative Humidity : 38.9%
Barometric Pressure : 99.96kPa

Calibration Technician : Vicky Jaiswal
Calibration Date : 05/06/2017
Secondary Check: Nick Williams
Report Issue Date : 06/06/2017

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
5.2.2: Generated Sound Pressure Level	*Pass*	5.3.2: Frequency Generated	*Pass*
5.2.3: Short Term Fluctuation	*Pass*	5.5: Total Distortion	*Pass*

	Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
Measured Output	94.0	1000.0	93.8	1000.33

The sound calibrator has been shown to conform to the class 2 requirements for periodic testing, described in Annex B of IEC 60942:2004 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed..

Least Uncertainties of Measurement -

Specific Tests		Environmental Conditions	
Generated SPL	*±0.11dB*	*Temperature*	*±0.05°C*
Short Term Fluct.	*±0.02dB*	*Relative Humidity*	*±0.46%*
Frequency	*±0.01%*	*Barometric Pressure*	*±0.017kPa*
Distortion	*±0.5%*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

NATA
WORLD RECOGNISED ACCREDITATION

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PAGE 1 OF 1

Appendix F – Construction Noise Monitoring Data

Borg Panels Facility

Construction Noise Monitoring

Quarter 2 2018

Prepared for

Borg Construction Pty Ltd

Global Acoustics

Noise and Vibration Analysis and Solutions

Global Acoustics Pty Ltd
PO Box 3115 | Thornton NSW 2322
Telephone +61 2 4966 4333
Email global@globalacoustics.com.au
ABN 94 094 985 734

Borg Panels Facility

Quarter 2 2018
Construction Noise Monitoring

Reference: 18192_R01
Report date: 21 June 2018

Prepared for
Borg Construction Pty Ltd
124 Lowes Mount Road
Oberon 2787 NSW

Prepared by
Global Acoustics Pty Ltd
PO Box 3115
Thornton NSW 2322

Prepared:	Jesse Tribby Consultant	QA Review:	Robert Kirwan Consultant

Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire

EXECUTIVE SUMMARY

Global Acoustics was engaged by Borg Construction Pty Ltd to undertake attended noise monitoring at sites around the Borg panel manufacturing facility (Borg) at Oberon, NSW.

The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Construction Noise Management Plan (CNMP).

Attended environmental noise monitoring described in this report was undertaken during the day period on 24 May 2018. There were 4 attended monitoring locations as listed in Table 1.1 and shown in Figure 1.

Attended monitoring was conducted in general accordance with Australian Standard AS 1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements.

Borg operations complied with the relevant noise limits during the Quarter 2 2018 survey at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Global Acoustics Pty Ltd

Table of Contents

Appendices

1 INTRODUCTION

1.1 Background

Global Acoustics was engaged by Borg Construction Pty Ltd to undertake attended noise monitoring at sites around the Borg panel manufacturing facility (Borg) at Oberon, NSW.

The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Construction Noise Management Plan (CNMP).

Attended environmental noise monitoring described in this report was undertaken during the day period on 24 May 2018.

1.2 Monitoring Locations

There were 4 attended monitoring locations as listed in Table 1.1 and shown in Figure 1.

Table 1.1: ATTENDED MONITORING LOCATIONS

Report Descriptor	Monitoring Location
NM1	Oberon Caravan Park
NM2	Intersection of Pine Street and Herborn Street
NM3	127 Hazelgrove Road
NM4	Intersection of Tasman Street and Earl Street

Figure 1: Attended Noise Monitoring Locations

1.3 Terminology & Abbreviations

Some definitions of terms and abbreviations, which may be used in this report, are provided in Table 1.2.

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
L_A	The A-weighted root mean squared (RMS) noise level at any instant
L_{Amax}	The maximum A-weighted noise level over a time period or for an event
L_{A1}	The noise level which is exceeded for 1 per cent of the time
L_{A10}	The noise level which is exceeded for 10 percent of the time, which is approximately the average of the maximum noise levels
L_{A50}	The noise level which is exceeded for 50 per cent of the time
L_{A90}	The level exceeded for 90 percent of the time, which is approximately the average of the minimum noise levels. The L_{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes
L_{Amin}	The minimum A-weighted noise level over a time period or for an event
L_{Aeq}	The average noise energy during a measurement period
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise
SPL	Sound pressure level (SPL), fluctuations in pressure measured as 10 times a logarithmic scale, the reference pressure being 20 micropascals
Hertz (Hz)	Cycles per second, the frequency of fluctuations in pressure, sound is usually a combination of many frequencies together
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude. Estimated from wind speed and sigma theta data
IA	Inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
NM	Not Measurable. If site only noise is noted as NM, this means some noise from the source of interest was audible at low-levels, but could not be quantified
Day	This is the period 7:00am to 6:00pm
Evening	This is the period 6:00pm to 10:00pm
Night	This is the period 10:00pm to 7:00am

2 CONSENT AND CRITERIA

All monitoring reported in this document has been carried out in general accordance with the Development Consent (the Consent) dated 29 May 2017 (SSD 7016) and the CNMP.

2.1 Development Consent and Project Specific Criteria

The sections of the Consent relating to noise are reproduced in Appendix A.

Table 2 in Schedule B of the Consent outlines the day, evening and night period impact assessment criteria, which have been reproduced in Table 2.1 below.

Table 2.1: IMPACT ASSESSMENT CRITERIA

Location	Day $L_{Aeq,15minute}$ dB	Evening $L_{Aeq,15minute}$ dB	Night $L_{Aeq,15minute}$ dB
All sensitive receivers	55	50	45

As described in the Consent, noise generated by Borg is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy (INP), as follows:

- during rain and wind speeds greater than 3 metres/second at 10 metres above ground level; or
- stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- stability category G temperature inversion conditions.

2.2 Project Specific Noise Limits

In accordance with the Consent and CNMP, project specific noise criteria for each monitoring location are detailed in Table 2.2 and Table 2.3.

Table 2.2: GENERAL CONSTRUCTION NOISE LIMITS

Report Descriptor	Day $L_{Aeq,15minute}$ dB	Evening $L_{Aeq,15minute}$ dB	Night $L_{Aeq,15minute}$ dB
NM1	55	50	45
NM2	55	50	45
NM3	55	50	45
NM4	55	50	45

Table 2.3: ROCK / CONCRETE BREAKING NOISE LIMITS

Report Descriptor	Day $L_{Aeq,15minute}$ dB
NM1	75
NM2	75
NM3	75
NM4	75

2.3 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017, and supersedes the EPA's Industrial Noise Policy (INP, 2000). Assessment and reporting of modifying factors is to be carried out in accordance with Fact Sheet C of the NPfI.

NPfI modifying factors, as they are applicable to mining noise, are described in more detail below.

2.3.1 Tonality and Intermittent Noise

As defined in the Noise Policy for Industry:

> *Tonal noise contains a prominent frequency and is characterised by a definite pitch.*
>
> *Intermittent noise is noise where the level suddenly drops/increases several times during the assessment period, with a noticeable change in source noise level of at least 5 dB(A); for example, equipment cycling on and off. The intermittency correction is not intended to be applied to changes in noise level due to meteorology.*

2.3.2 Low Frequency Noise

As defined in the Noise Policy for Industry:

> *Low frequency noise is noise with an unbalanced spectrum and containing major components within the low-frequency range (10 – 160 Hz) of the frequency spectrum.*

The NPfI contains the current method of assessing low frequency noise, which is a 2 step process as detailed below:

> *Measure/assess source contribution C-weighted and A-weighted L_{eq},T levels over the same time period. The low frequency noise modifying factor correction is to be applied where the C-A level is 15 dB or more and:*
>
> - *where any of the 1/3 octave noise levels in Table C2 are exceeded by **up to and including** 5 dB and cannot be mitigated, a 2 dBA positive adjustment to measured A weighted levels applies for the evening/night period; and*
>
> - *where any of the 1/3 octave noise levels in Table C2 are exceeded by **more than** 5 dB and cannot be mitigated, a 5 dBA positive adjustment to measured A weighted levels applies for the evening/night period and a 2 dBA positive adjustment applies for the daytime period.*

Table C2 and associated notes from the NPfI is reproduced below:

Table C2: One-third octave low-frequency noise thresholds.

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

Notes:

- dB(Z) = decibel (Z frequency weighted).
- For the assessment of low-frequency noise, care should be taken to select a wind screen that can protect the microphone from wind-induced noise characteristics at least 10 dB below the threshold values in Table C2 for

wind speeds up to 5 metres per second. It is likely that high performance larger diameter wind screens (nominally 175 mm) will be required to achieve this performance (Hessler, 2008). In any case, the performance of the wind screen and wind speeds at which data will be excluded needs to be stated.

- Low-frequency noise corrections only apply under the standard and/or noise-enhancing meteorological conditions.
- Where a receiver location has had architectural acoustic treatment applied (including alternative means of mechanical ventilation satisfying the Building Code of Australia) by a proponent, as part of consent requirements or as a private negotiated agreement, alternative external low-frequency noise assessment criteria may be proposed to account for the higher transmission loss of the building façade.
- Measurements should be made between 1.2 and 1.5 metres above ground level unless otherwise approved through a planning instrument (consent/approval) or environment protection licence, and at locations nominated in the development consent or licence.

3 METHODOLOGY

3.1 Overview

All noise monitoring was conducted at locations representative of the nearest residences in accordance with Australian Standard AS1055 ' Acoustics, Description and Measurement of Environmental Noise', relevant NSW EPA requirements, the Consent and CNMP.

Meteorological data was obtained from the Borg weather station in Oberon. This data allowed correlation of atmospheric parameters and measured noise levels. Atmospheric condition measurement at ground level was also undertaken during attended monitoring.

3.2 Attended Noise Monitoring

Attended monitoring is preferred to the use of noise loggers when determining compliance with prescribed limits as it allows the most accurate determination of the contribution, if any, to measured noise levels by the source of interest, in this case Borg. The duration of each individual measurement was 15 minutes.

If the exact contribution of the source of interest cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise levels, for example, L_{A10}, L_{A50} or L_{A90}. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also be used in this report. When site noise is noted as IA, no site noise was audible at the monitoring location. When site noise is noted as NM, this means some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods as per the NPfI (e.g. measure closer and back calculate) to determine a value for reporting.

Therefore, all sites noted as NM in this report are due to one or more of the following reasons:

- site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- it was not feasible or reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, rough terrain preventing closer measurement, addition/removal of significant source to receiver shielding caused by moving closer, and meteorological conditions where back calculation may not be accurate.

3.3 Modifying Factors

Years of monitoring have indicated that noise levels from the facility, particularly those measured at significant distances from the source are relatively continuous and broad spectrum. Given this, noise levels from Borg at the monitoring locations are unlikely to be intermittent or tonal.

Assessment of low-frequency modifying factors is necessary when application of the maximum correction could potentially result in an exceedance of the relevant site-only L_{Aeq} criterion. Low-frequency analysis is therefore undertaken for measurements in this report where:

- meteorological conditions resulted in criteria being applicable;
- contributions from Borg were audible and directly measurable, such that the site-only L_{Aeq} was not "NM" or less than a maximum cut off value (e.g. "<20 dB" or "<30dB");
- contributions from Borg were within 5 dB of the relevant L_{Aeq} criterion, as 5 dB is the maximum penalty that can be applied by low-frequency modifying factors; and
- Borg was the dominant low-frequency noise source.

All measurements meeting these conditions were evaluated for possible low frequency penalty applicability in accordance with the NPfI.

3.4 Monitoring Equipment

The equipment used to measure environmental noise levels is detailed in Table 3.1. Calibration certificates are provided in Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level analyser	01070590	28/06/2018
Pulsar Model 106 acoustic calibrator	79631	30/03/2019

4 RESULTS

4.1 Modifying Factors

Measured BCM only levels were assessed for the applicability of modifying factors in accordance with the EPA's NPfI.

There were no intermittent noise sources from site during the survey. In addition, there is no equipment on site that is likely to generate tonal noise as defined in the NPfI. None of the measurements satisfied the conditions outlined in Section 3.3 when assessing low frequency noise.

Therefore no further assessment of modifying factors was undertaken.

4.2 Attended Noise Monitoring

Total noise levels measured at each location are provided in Table 4.1.

Table 4.1: MEASURED NOISE LEVELS – QUARTER 2 2018[1]

Location	Start Date and Time	L_{Amax} dB	L_{A1} dB	L_{A10} dB	L_{A50} dB	L_{Aeq} dB	L_{A90} dB	L_{Amin} dB	L_{Ceq} dB
NM1	24/05/2018 11:49	60	53	48	45	46	43	41	63
NM2	24/05/2018 11:29	53	47	43	41	41	39	36	60
NM3	24/05/2018 12:35	53	49	45	42	43	40	38	58
NM4	24/05/2018 12:12	57	46	42	41	42	40	38	58

Notes: 1. Levels in this table are not necessarily the result of activity at Borg.

Table 4.2 compares measured $L_{Aeq,15minute}$ levels from Borg with the Consent and CNMP noise criteria.

Table 4.2: $L_{Aeq,15minute}$ GENERATED BY BORG AGAINST CRITERIA – QUARTER 2 2018

Location	Start Date and Time	Wind Speed m/s[1]	Stability Class[1]	VTG °C per 100m[1]	Criterion dB	Criterion Applies?[2,3]	Borg $L_{Aeq,15min}$ dB[4]	Exceedance [5,6]
NM1	24/05/2018 11:49	2.6	A	-2.0	55	Yes	NM	Nil
NM2	24/05/2018 11:29	3.1	B	-1.8	55	No	IA	NA
NM3	24/05/2018 12:35	3.1	B	-1.8	55	No	43	NA
NM4	24/05/2018 12:12	3.2	B	-1.8	55	No	<40	NA

Notes:

1. *Atmospheric data is sourced from Borg weather station in Oberon;*
2. *In accordance with EPL and PA, the noise criteria are to apply under all meteorological conditions except the following:*
   - *Wind speeds greater than 3 m/s at 10 metres above ground level; or*
   - *Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or*
   - *Stability class G temperature inversion conditions.*
3. *Criterion may or may not apply due to rounding of meteorological data values;*
4. *Estimated or measured $L_{Aeq,15minute}$ attributed to the Borg;*
5. *Bold results in red indicate exceedance of criteria (if applicable); and*
6. *NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable*

4.3 Atmospheric Conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.3. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain or hail.

Table 4.3: MEASURED ATMOSPHERIC CONDITIONS – QUARTER 2 2018

Location	Start Date and Time	Temperature (degrees)	Wind Speed (m/s)	Wind Direction[1]	Cloud Cover (1/8s)
NM1	24/05/2018 11:49	17	1.1	250	0
NM2	24/05/2018 11:29	18	0.9	310	0
NM3	24/05/2018 12:35	20	1.9	240	0
NM4	24/05/2018 12:12	20	1.2	210	0

Notes:

1. *"-" indicates calm conditions at 1.8 metres.*

5 SUMMARY

Global Acoustics was engaged by Borg Construction Pty Ltd to undertake attended noise monitoring at sites around the Borg panel manufacturing facility at Oberon, NSW.

The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Construction Noise Management Plan.

Attended environmental noise monitoring described in this report was undertaken during the day period on 24 May 2018.

Borg operations complied with the relevant criteria during the Quarter 2 2018 survey at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Global Acoustics Pty Ltd

APPENDIX

A STATUTORY REQUIREMENTS

A.1 BORG PANELS FACILITY DEVELOPMENT CONSENT

NOISE

Hours of Work

B13. The Applicant must comply with the hours detailed in **Table 1**, unless otherwise agreed in writing by the Secretary.

Table 1: Hours of Work

Activity	Day	Time
Earthworks and Construction	Monday – Friday Saturday	7 am to 7 pm 8 am to 1 pm
Operation	Monday – Sunday	24 hours

B14. Works outside of the hours identified in Condition B13 may be undertaken in the following circumstances:
(a) works that are inaudible at the nearest sensitive receivers;
(b) works agreed to in writing by the Secretary;
(c) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or
(d) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

Construction Noise Management Plan

B15. The Applicant must prepare a Construction Noise Management Plan (CNMP) for the Project to manage construction noise. The plan must form part of the CEMP required by Condition C1 and must:
(a) be prepared by a suitably qualified and experienced noise expert;
(b) be approved by the Secretary prior to the commencement of construction of the Project;
(c) describe procedures for achieving the noise limits in **Table 2**;
(d) describe the measures to be implemented to manage noisy works such as rock/concrete breaking activities, in close proximity to sensitive receivers;
(e) include strategies that have been developed with the community for managing noisy works;
(f) describe the community consultation undertaken to develop the strategies in e) above; and
(g) include a complaints management system that would be implemented for the duration of the Project.

Operational Noise Limits

B16. The Applicant must ensure that noise generated by the Development does not exceed the noise limits in **Table 2.**

Table 2: Noise Limits dB(A)

Location	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$	Night $L_{Aeq(15\ minute)}$
All sensitive receivers	55	50	45

Note: *Noise generated by the Development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.*

Noise Mitigation

B17. The Applicant must ensure all noise attenuation measures already installed for the Existing Development are maintained in good working order for the life of the Development.

Operational Noise Management Plan

B18. Within 6 months of the date of this consent, the Applicant must prepare an Operational Noise Management Plan (ONMP) for the Existing Development, to manage operational noise to the satisfaction of the Secretary. The ONMP must form part of the OEMP required by Condition C4 and be prepared in accordance with Condition C9. The ONMP must:
(a) be prepared by a suitably qualified and experienced noise expert;
(b) describe the measures that will be implemented to minimise noise from the Existing Development including:
(i) all reasonable and feasible measures being employed on site;
(ii) maintain equipment to ensure it is in good order;
(iii) traffic noise is effectively managed;
(iv) the noise impacts of the Existing Development are minimised during any meteorological conditions when the noise criteria in this consent do not apply;
(v) compliance with the relevant conditions of this consent;
(c) includes a noise monitoring program that:
(i) must be carried out until otherwise agreed to in writing by the Secretary;
(ii) is capable of evaluating the performance of the Existing Development; and
(iii) includes a protocol for determining exceedances of the relevant conditions of this consent and responding to complaints; and
(d) include a procedure for implementing noise mitigation measures, should the Applicant be directed by the EPA or the Secretary, or should non-compliances be detected.

B19. Prior to the commencement of operation of the Project, the Applicant must update the ONMP required under Condition B18, to incorporate the Project and its management, to the satisfaction of the Secretary. The updated plan must be prepared in accordance with the requirements of Condition B18, and must incorporate the following:
(a) description of the noise monitoring program to measure the performance of the Development against this consent and the EPL; and
(b) description of any additional measures that would be implemented for the Development to ensure compliance with the noise limits in Condition B16 and the EPL.

Noise Verification

B20. Within 3 months of commencement of operation of the Project, the Applicant must undertake a noise verification study for the Development to the satisfaction of the Secretary. The study must:
(a) be undertaken by a suitably qualified expert;
(b) include an analysis of compliance with noise limits specified in Condition B16;
(c) demonstrate achievement of the sound power levels in Table 12 of the *Borg Panels Timber Panel Processing Facility Noise and Vibration Impact Assessment*, dated May 2016 and prepared by Global Acoustics;
(d) include an outline of management actions to be taken to address any exceedances of the limits specified in Condition B16; and
(e) describe the contingency measures in the event management actions are not effective in reducing noise levels to an acceptable level.

Within 1 month of completing the study, the Applicant must submit a report outlining the findings of the study to the Secretary and the EPA.

B21. Should the noise verification study indicate the Development has not complied with the noise limits in Condition B16 and applicable EPL requirements, or where the verification indicates that greater impacts than predicted in the EIS may arise, a detailed investigation and an outline of any management measures necessary to prevent exceedances must be submitted to the Secretary and the EPA, as part of the study.

Borg will implement reasonable and practical measures to avoid or minimise impacts to the environment that may arise as a result of the project.

Borg will carry out the proposed works in accordance with the EIS, RTS and the approval conditions.

Noise

Attenuation, as detailed in the NIA, will be implemented as follows:

- Conti 1 Dryer Fan air intake redesigned and the fan speed reduced to minimise noise generated. A sound power reduction from LAeq 121 dB to 114 dB or better is required.
- Booster fan will receive additional insulation and a reduction in fan speed. A sound power reduction from LAeq 116 dB to 109 dB or better is required.
- Main fibre transport fan will have a concrete enclosure constructed around it. A sound power reduction from LAeq 110 dB to 104 dB or better is required.

In short, the approach taken by Borg to mitigate noise is based on a number of factors:

1. Continuation of the use of mobile chippers (that is, not to enclose the mobile chippers). However, these are backup items (only to be used when enclosed, electric chippers are not operational), and will not be used in enhancing met conditions.
2. Implementation of additional noise mitigation measures to minimise noise generated by equipment, as detailed above.
3. Provision of sound attenuation structures and enclosures to other equipment where appropriate.

Irrespective of the above, Borg undertakes to meet the existing plant sound power reductions specified in the NIA. If the proposed attenuation measures to the existing plant are found to be insufficient in achieving these reductions, additional works will be undertaken.

APPENDIX

B CALIBRATION CERTIFICATES

Acoustic Research Labs Pty Ltd
Level 7 Building 2 423 Pennant Hills Rd
Pennant Hills NSW AUSTRALIA 2120
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3.2006

Calibration Certificate

Calibration Number C16323

Client Details	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thorton NSW 2322
Equipment Tested/ Model Number :	Rion NA-28
Instrument Serial Number :	01070590
Microphone Serial Number :	08184
Pre-amplifier Serial Number :	52329

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	21.4°C	**Ambient Temperature :**	21.4°C
Relative Humidity :	37.5%	**Relative Humidity :**	37.5%
Barometric Pressure :	100.19kPa	**Barometric Pressure :**	100.23kPa

Calibration Technician :	Calvin Simpfendorfer	**Secondary Check:**	Riley Cooper
Calibration Date :	28/06/2016	**Report Issue Date :**	30/06/2016

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
10: Self-generated noise	*Pass*	14: Level linearity on the reference level range	*Pass*
11: Acoustical tests of a frequency weighting	*Pass*	15: Level linearity incl. the level range control	*Pass*
12: Electrical tests of frequency weightings	*Pass*	16: Toneburst response	*Pass*
13: Frequency and time weightings at 1 kHz	*Pass*	17: Peak C sound level	*Pass*
		18: Overload Indication	*Pass*

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	*±0.12dB*	*Temperature*	*±0.05°C*
12.5kHz	*±0.18dB*	*Relative Humidity*	*±0.46%*
16kHz	*±0.31dB*	*Barometric Pressure*	*±0.017kPa*
Electrical Tests			
31.5 Hz to 20 kHz	*±0.12dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

NATA
WORLD RECOGNISED ACCREDITATION

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/National standards.

PAGE 1 OF 1

Acoustic Research Labs Pty Ltd
Level 7 Building 2 423 Pennant Hills Rd
Pennant Hills NSW AUSTRALIA 2120
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Sound Calibrator
IEC 60942-2004

Calibration Certificate

Calibration Number C17149

Client Details Global Acoustics Pty Ltd
12/16 Huntingdale Drive
Thornton NSW 2322

Equipment Tested/ Model Number : Pulsar 106
Instrument Serial Number : 79631

Atmospheric Conditions
Ambient Temperature : 21.9°C
Relative Humidity : 54.6%
Barometric Pressure : 98.84kPa

Calibration Technician : Vicky Jaiswal
Secondary Check: Riley Cooper
Calibration Date : 30/03/2017
Report Issue Date : 31/03/2017

Approved Signatory : Juan Aguero

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
5.2.2: Generated Sound Pressure Level	*Pass*	5.3.2: Frequency Generated	*Pass*
5.2.3: Short Term Fluctuation	*Pass*	5.5: Total Distortion	*Pass*

	Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
Measured Output	94.0	1000.0	94.1	1000.38

The sound calibrator has been shown to conform to the class 2 requirements for periodic testing, described in Annex B of IEC 60942:2004 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Least Uncertainties of Measurement -

Specific Tests		Environmental Conditions	
Generated SPL	*±0.11dB*	*Temperature*	*±0.05°C*
Short Term Fluct.	*±0.02dB*	*Relative Humidity*	*±0.46%*
Frequency	*±0.01%*	*Barometric Pressure*	*±0.017kPa*
Distortion	*±0.5%*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

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NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports

PAGE 1 OF 1

Borg Panels Facility

Construction Noise Monitoring

Quarter 3 2018

Prepared for

Borg Construction Pty Ltd

Global Acoustics

Noise and Vibration Analysis and Solutions

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Email global@globalacoustics.com.au
ABN 94 094 985 734

Borg Panels Facility

Quarter 3 2018
Construction Noise Monitoring

Reference: 18296_R01
Report date: 4 September 2018

Prepared for

Borg Construction Pty Ltd
124 Lowes Mount Road
Oberon 2787 NSW

Prepared by

Global Acoustics Pty Ltd
PO Box 3115
Thornton NSW 2322

Prepared:	Amanda Borserio Consultant	QA Review:	Robert Kirwan Consultant

Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire

EXECUTIVE SUMMARY

Global Acoustics was engaged by Borg Construction Pty Ltd to undertake attended noise monitoring at sites around the Borg panel manufacturing facility (Borg) at Oberon, NSW.

The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Construction Noise Management Plan (CNMP).

Attended environmental noise monitoring described in this report was undertaken during the day period on 23 August 2018. There were 4 attended monitoring locations as listed in Table 1.1 and shown in Figure 1.

Attended monitoring was conducted in general accordance with Australian Standard AS 1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements.

Borg operations complied with the relevant noise limits during the Quarter 3 2018 survey at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Global Acoustics Pty Ltd

Table of Contents

Appendices

1 INTRODUCTION

1.1 Background

Global Acoustics was engaged by Borg Construction Pty Ltd to undertake attended noise monitoring at sites around the Borg panel manufacturing facility (Borg) at Oberon, NSW.

The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Construction Noise Management Plan (CNMP).

Attended environmental noise monitoring described in this report was undertaken during the day period on 23 August 2018.

1.2 Monitoring Locations

There were 4 attended monitoring locations as listed in Table 1.1 and shown in Figure 1.

Table 1.1: ATTENDED MONITORING LOCATIONS

Report Descriptor	Monitoring Location
NM1	Oberon Caravan Park
NM2	Intersection of Pine Street and Herborn Street
NM3	127 Hazelgrove Road
NM4	Intersection of Tasman Street and Earl Street

Figure 1: Attended Noise Monitoring Locations

1.3 Terminology & Abbreviations

Some definitions of terms and abbreviations, which may be used in this report, are provided in Table 1.2.

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
L_A	The A-weighted root mean squared (RMS) noise level at any instant
L_{Amax}	The maximum A-weighted noise level over a time period or for an event
L_{A1}	The noise level which is exceeded for 1 per cent of the time
$L_{A1,1minute}$	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute
L_{A10}	The noise level which is exceeded for 10 percent of the time, which is approximately the average of the maximum noise levels
L_{A50}	The noise level which is exceeded for 50 per cent of the time
L_{A90}	The level exceeded for 90 percent of the time, which is approximately the average of the minimum noise levels. The L_{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes
L_{Amin}	The minimum A-weighted noise level over a time period or for an event
L_{Aeq}	The average noise energy during a measurement period
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise
SPL	Sound pressure level (SPL), fluctuations in pressure measured as 10 times a logarithmic scale, the reference pressure being 20 micropascals
Hertz (Hz)	Cycles per second, the frequency of fluctuations in pressure, sound is usually a combination of many frequencies together
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude. Estimated from wind speed and sigma theta data
IA	Inaudible. When site only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
NM	Not Measurable. If site only noise is noted as NM, this means some noise from the source of interest was audible at low-levels, but could not be quantified
Day	This is the period 7:00am to 6:00pm
Evening	This is the period 6:00pm to 10:00pm
Night	This is the period 10:00pm to 7:00am

2 CONSENT AND CRITERIA

All monitoring reported in this document has been carried out in general accordance with the Development Consent (the Consent) dated 29 May 2017 (SSD 7016) and the CNMP.

2.1 Development Consent and Project Specific Criteria

The sections of the Consent relating to noise are reproduced in Appendix A.

Table 2 in Schedule B of the Consent outlines the day, evening and night period impact assessment criteria, which have been reproduced in Table 2.1 below.

Table 2.1: IMPACT ASSESSMENT CRITERIA

Location	Day $L_{Aeq,15minute}$ dB	Evening $L_{Aeq,15minute}$ dB	Night $L_{Aeq,15minute}$ dB
All sensitive receivers	55	50	45

As described in the Consent, noise generated by Borg is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy (INP), as follows:

- during rain and wind speeds greater than 3 metres/second at 10 metres above ground level; or
- stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- stability category G temperature inversion conditions.

2.2 Project Specific Noise Limits

In accordance with the Consent and CNMP, project specific noise criteria for each monitoring location are detailed in Table 2.2 and Table 2.3.

Table 2.2: GENERAL CONSTRUCTION NOISE LIMITS

Report Descriptor	Day $L_{Aeq,15minute}$ dB	Evening $L_{Aeq,15minute}$ dB	Night $L_{Aeq,15minute}$ dB
NM1	55	50	45
NM2	55	50	45
NM3	55	50	45
NM4	55	50	45

Table 2.3: ROCK / CONCRETE BREAKING NOISE LIMITS

Report Descriptor	Day $L_{Aeq,15minute}$ dB
NM1	75
NM2	75
NM3	75
NM4	75

2.3 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017, and supersedes the EPA's Industrial Noise Policy (INP, 2000). Assessment and reporting of modifying factors is to be carried out in accordance with Fact Sheet C of the NPfI.

NPfI modifying factors, as they are applicable to mining noise, are described in more detail below.

2.3.1 Tonality and Intermittent Noise

As defined in the NPfI:

> *Tonal noise contains a prominent frequency and is characterised by a definite pitch.*
>
> *Intermittent noise is noise where the level suddenly drops/increases several times during the assessment period, with a noticeable change in source noise level of at least 5 dB(A); for example, equipment cycling on and off. The intermittency correction is not intended to be applied to changes in noise level due to meteorology.*

2.3.2 Low Frequency Noise

As defined in the NPfI:

> *Low frequency noise is noise with an unbalanced spectrum and containing major components within the low-frequency range (10 – 160 Hz) of the frequency spectrum.*

The NPfI contains the current method of assessing low frequency noise, which is a 2 step process as detailed below:

> *Measure/assess source contribution C-weighted and A-weighted L_{eq},T levels over the same time period. The low frequency noise modifying factor correction is to be applied where the C-A level is 15 dB or more and:*
>
> - *where any of the 1/3 octave noise levels in Table C2 are exceeded by **up to and including** 5 dB and cannot be mitigated, a 2 dBA positive adjustment to measured A weighted levels applies for the evening/night period; and*
>
> - *where any of the 1/3 octave noise levels in Table C2 are exceeded by **more than** 5 dB and cannot be mitigated, a 5 dBA positive adjustment to measured A weighted levels applies for the evening/night period and a 2 dBA positive adjustment applies for the daytime period.*

Table C2 and associated notes from the NPfI is reproduced below:

Table C2: One-third octave low-frequency noise thresholds.

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

Notes:

- dB(Z) = decibel (Z frequency weighted).
- For the assessment of low-frequency noise, care should be taken to select a wind screen that can protect the microphone from wind-induced noise characteristics at least 10 dB below the threshold values in Table C2 for

wind speeds up to 5 metres per second. It is likely that high performance larger diameter wind screens (nominally 175 mm) will be required to achieve this performance (Hessler, 2008). In any case, the performance of the wind screen and wind speeds at which data will be excluded needs to be stated.

- Low-frequency noise corrections only apply under the standard and/or noise-enhancing meteorological conditions.
- Where a receiver location has had architectural acoustic treatment applied (including alternative means of mechanical ventilation satisfying the Building Code of Australia) by a proponent, as part of consent requirements or as a private negotiated agreement, alternative external low-frequency noise assessment criteria may be proposed to account for the higher transmission loss of the building façade.
- Measurements should be made between 1.2 and 1.5 metres above ground level unless otherwise approved through a planning instrument (consent/approval) or environment protection licence, and at locations nominated in the development consent or licence.

3 METHODOLOGY

3.1 Overview

All noise monitoring was conducted at locations representative of the nearest residences in accordance with Australian Standard AS1055 ' Acoustics, Description and Measurement of Environmental Noise', relevant NSW EPA requirements, the Consent and CNMP.

Meteorological data was obtained from the Borg weather station in Oberon. This data allowed correlation of atmospheric parameters and measured noise levels. Atmospheric condition measurement at ground level was also undertaken during attended monitoring.

3.2 Attended Noise Monitoring

Attended monitoring is preferred to the use of noise loggers when determining compliance with prescribed limits as it allows the most accurate determination of the contribution, if any, to measured noise levels by the source of interest, in this case Borg. The duration of each individual measurement was 15 minutes.

If the exact contribution of the source of interest cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise levels, for example, L_{A10}, L_{A50} or L_{A90}. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also be used in this report. When site noise is noted as IA, no site noise was audible at the monitoring location. When site noise is noted as NM, this means some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods as per the NPfI (e.g. measure closer and back calculate) to determine a value for reporting.

Therefore, all sites noted as NM in this report are due to one or more of the following reasons:

- site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- it was not feasible or reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, rough terrain preventing closer measurement, addition/removal of significant source to receiver shielding caused by moving closer, and meteorological conditions where back calculation may not be accurate.

3.3 Modifying Factors

Years of monitoring have indicated that noise levels from the facility, particularly those measured at significant distances from the source are relatively continuous and broad spectrum. Given this, noise levels from Borg at the monitoring locations are unlikely to be intermittent or tonal.

Assessment of low-frequency modifying factors is necessary when application of the maximum correction could potentially result in an exceedance of the relevant site-only L_{Aeq} criterion. Low-frequency analysis is therefore undertaken for measurements in this report where:

- meteorological conditions resulted in criteria being applicable;
- contributions from Borg were audible and directly measurable, such that the site-only L_{Aeq} was not "NM" or less than a maximum cut off value (e.g. "<20 dB" or "<30dB");
- contributions from Borg were within 5 dB of the relevant L_{Aeq} criterion, as 5 dB is the maximum penalty that can be applied by low-frequency modifying factors; and
- Borg was the dominant low-frequency noise source.

All measurements meeting these conditions were evaluated for possible low frequency penalty applicability in accordance with the NPfI.

3.4 Monitoring Equipment

The equipment used to measure environmental noise levels is detailed in Table 3.1. Calibration certificates are provided in Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level analyser	701424	05/06/2019
Pulsar 106 acoustic calibrator	74813	05/06/2019

4 RESULTS

4.1 Modifying Factors

Measured BCM only levels were assessed for the applicability of modifying factors in accordance with the EPA's NPfI.

There were no intermittent or tonal noise sources, as defined in the NPfI, audible from site during the survey. None of the measurements satisfied the conditions outlined in Section 3.3 when assessing low frequency noise.

Therefore no further assessment of modifying factors was undertaken.

4.2 Attended Noise Monitoring

Total noise levels measured at each location are provided in Table 4.1.

Table 4.1: MEASURED NOISE LEVELS – QUARTER 3 2018[1]

Location	Start Date and Time	L_{Amax} dB	L_{A1} dB	L_{A10} dB	L_{A50} dB	L_{Aeq} dB	L_{A90} dB	L_{Amin} dB
NM1	23/08/2018 10:16	80	67	61	54	58	51	46
NM2	23/08/2018 10:41	72	59	50	47	50	45	43
NM3	23/08/2018 09:24	65	60	47	38	46	34	30
NM4	23/08/2018 09:48	75	66	52	42	53	39	35

Notes: 1. Levels in this table are not necessarily the result of activity at Borg.

Table 4.2 compares measured $L_{Aeq,15minute}$ levels from Borg with the Consent and CNMP noise criteria.

Table 4.2: $L_{Aeq,15minute}$ GENERATED BY BORG AGAINST CRITERIA – QUARTER 3 2018

Location	Start Date and Time	Wind Speed m/s[1]	Stability Class[1]	VTG °C per 100m[1]	Criterion dB	Criterion Applies?[2,3]	Borg $L_{Aeq,15min}$ dB[4]	Exceedance [5,6]
NM1	23/08/2018 10:16	4.9	B	-1.8	55	No	NM	NA
NM2	23/08/2018 10:41	3.4	B	-1.8	55	No	<45	NA
NM3	23/08/2018 09:24	4.0	B	-1.8	55	No	<30	NA
NM4	23/08/2018 09:48	4.2	C	-1.6	55	No	NM	NA

Notes:

1. *Atmospheric data is sourced from Borg weather station in Oberon;*
2. *In accordance with EPL and PA, the noise criteria are to apply under all meteorological conditions except the following:*
   - Wind speeds greater than 3 m/s at 10 metres above ground level; or
   - Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or
   - Stability class G temperature inversion conditions.
3. *Criterion may or may not apply due to rounding of meteorological data values;*
4. *Estimated or measured $L_{Aeq,15minute}$ attributed to the Borg;*
5. *Bold results in red indicate exceedance of criteria (if applicable); and*
6. *NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable*

4.3 Atmospheric Conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.3. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain or hail.

Table 4.3: MEASURED ATMOSPHERIC CONDITIONS – QUARTER 3 2018

Location	Start Date and Time	Temperature (degrees)	Wind Speed (m/s)	Wind Direction[1]	Cloud Cover (1/8s)
NM1	23/08/2018 10:16	7	2.2	60	7
NM2	23/08/2018 10:41	9	1.0	80	7
NM3	23/08/2018 09:24	7	0.4	160	5
NM4	23/08/2018 09:48	10	3.0	100	6

Notes:

1. *"-" indicates calm conditions at 1.8 metres.*

5 SUMMARY

Global Acoustics was engaged by Borg Construction Pty Ltd to undertake attended noise monitoring at sites around the Borg panel manufacturing facility at Oberon, NSW.

The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Construction Noise Management Plan.

Attended environmental noise monitoring described in this report was undertaken during the day period on 23 August 2018.

Borg operations complied with the relevant criteria during the Quarter 3 2018 survey at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Global Acoustics Pty Ltd

APPENDIX

A STATUTORY REQUIREMENTS

A.1 BORG PANELS FACILITY DEVELOPMENT CONSENT

NOISE

Hours of Work

B13. The Applicant must comply with the hours detailed in **Table 1**, unless otherwise agreed in writing by the Secretary.

Table 1: Hours of Work

Activity	Day	Time
Earthworks and Construction	Monday – Friday Saturday	7 am to 7 pm 8 am to 1 pm
Operation	Monday – Sunday	24 hours

B14. Works outside of the hours identified in Condition B13 may be undertaken in the following circumstances:
(a) works that are inaudible at the nearest sensitive receivers;
(b) works agreed to in writing by the Secretary;
(c) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or
(d) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

Construction Noise Management Plan

B15. The Applicant must prepare a Construction Noise Management Plan (CNMP) for the Project to manage construction noise. The plan must form part of the CEMP required by Condition C1 and must:
(a) be prepared by a suitably qualified and experienced noise expert;
(b) be approved by the Secretary prior to the commencement of construction of the Project;
(c) describe procedures for achieving the noise limits in **Table 2**;
(d) describe the measures to be implemented to manage noisy works such as rock/concrete breaking activities, in close proximity to sensitive receivers;
(e) include strategies that have been developed with the community for managing noisy works;
(f) describe the community consultation undertaken to develop the strategies in e) above; and
(g) include a complaints management system that would be implemented for the duration of the Project.

Operational Noise Limits

B16. The Applicant must ensure that noise generated by the Development does not exceed the noise limits in **Table 2.**

Table 2: Noise Limits dB(A)

Location	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$	Night $L_{Aeq(15\ minute)}$
All sensitive receivers	55	50	45

Note: *Noise generated by the Development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.*

Noise Mitigation

B17. The Applicant must ensure all noise attenuation measures already installed for the Existing Development are maintained in good working order for the life of the Development.

Operational Noise Management Plan

B18. Within 6 months of the date of this consent, the Applicant must prepare an Operational Noise Management Plan (ONMP) for the Existing Development, to manage operational noise to the satisfaction of the Secretary. The ONMP must form part of the OEMP required by Condition C4 and be prepared in accordance with Condition C9. The ONMP must:
(a) be prepared by a suitably qualified and experienced noise expert;
(b) describe the measures that will be implemented to minimise noise from the Existing Development including:
(i) all reasonable and feasible measures being employed on site;
(ii) maintain equipment to ensure it is in good order;
(iii) traffic noise is effectively managed;
(iv) the noise impacts of the Existing Development are minimised during any meteorological conditions when the noise criteria in this consent do not apply;
(v) compliance with the relevant conditions of this consent;
(c) includes a noise monitoring program that:
(i) must be carried out until otherwise agreed to in writing by the Secretary;
(ii) is capable of evaluating the performance of the Existing Development; and
(iii) includes a protocol for determining exceedances of the relevant conditions of this consent and responding to complaints; and
(d) include a procedure for implementing noise mitigation measures, should the Applicant be directed by the EPA or the Secretary, or should non-compliances be detected.

B19. Prior to the commencement of operation of the Project, the Applicant must update the ONMP required under Condition B18, to incorporate the Project and its management, to the satisfaction of the Secretary. The updated plan must be prepared in accordance with the requirements of Condition B18, and must incorporate the following:
(a) description of the noise monitoring program to measure the performance of the Development against this consent and the EPL; and
(b) description of any additional measures that would be implemented for the Development to ensure compliance with the noise limits in Condition B16 and the EPL.

Noise Verification

B20. Within 3 months of commencement of operation of the Project, the Applicant must undertake a noise verification study for the Development to the satisfaction of the Secretary. The study must:
(a) be undertaken by a suitably qualified expert;
(b) include an analysis of compliance with noise limits specified in Condition B16;
(c) demonstrate achievement of the sound power levels in Table 12 of the *Borg Panels Timber Panel Processing Facility Noise and Vibration Impact Assessment*, dated May 2016 and prepared by Global Acoustics;
(d) include an outline of management actions to be taken to address any exceedances of the limits specified in Condition B16; and
(e) describe the contingency measures in the event management actions are not effective in reducing noise levels to an acceptable level.

Within 1 month of completing the study, the Applicant must submit a report outlining the findings of the study to the Secretary and the EPA.

B21. Should the noise verification study indicate the Development has not complied with the noise limits in Condition B16 and applicable EPL requirements, or where the verification indicates that greater impacts than predicted in the EIS may arise, a detailed investigation and an outline of any management measures necessary to prevent exceedances must be submitted to the Secretary and the EPA, as part of the study.

Borg will implement reasonable and practical measures to avoid or minimise impacts to the environment that may arise as a result of the project.

Borg will carry out the proposed works in accordance with the EIS, RTS and the approval conditions.

Noise

Attenuation, as detailed in the NIA, will be implemented as follows:

- Conti 1 Dryer Fan air intake redesigned and the fan speed reduced to minimise noise generated. A sound power reduction from LAeq 121 dB to 114 dB or better is required.
- Booster fan will receive additional insulation and a reduction in fan speed. A sound power reduction from LAeq 116 dB to 109 dB or better is required.
- Main fibre transport fan will have a concrete enclosure constructed around it. A sound power reduction from LAeq 110 dB to 104 dB or better is required.

In short, the approach taken by Borg to mitigate noise is based on a number of factors:

1. Continuation of the use of mobile chippers (that is, not to enclose the mobile chippers). However, these are backup items (only to be used when enclosed, electric chippers are not operational), and will not be used in enhancing met conditions.
2. Implementation of additional noise mitigation measures to minimise noise generated by equipment, as detailed above.
3. Provision of sound attenuation structures and enclosures to other equipment where appropriate.

Irrespective of the above, Borg undertakes to meet the existing plant sound power reductions specified in the NIA. If the proposed attenuation measures to the existing plant are found to be insufficient in achieving these reductions, additional works will be undertaken.

APPENDIX

B CALIBRATION CERTIFICATES

Acoustic Research Labs Pty Ltd
Level 7 Building 2 423 Pennant Hills Rd
Pennant Hills NSW AUSTRALIA 2120
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3.2013
Calibration Certificate

Calibration Number C17248

Client Details	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
Equipment Tested/ Model Number :	Rion NA-28
Instrument Serial Number :	00701424
Microphone Serial Number :	01916
Pre-amplifier Serial Number :	01463

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	24.3°C	**Ambient Temperature :**	24.4°C
Relative Humidity :	40%	**Relative Humidity :**	39.5%
Barometric Pressure :	100.05kPa	**Barometric Pressure :**	100kPa

Calibration Technician :	Vicky Jaiswal	**Secondary Check:**	Nick Williams
Calibration Date :	05/06/2017	**Report Issue Date :**	06/06/2017

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*Pass*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	*±0.16dB*	*Temperature*	*±0.05°C*
12.5kHz	*±0.2dB*	*Relative Humidity*	*±0.46%*
16kHz	*±0.29dB*	*Barometric Pressure*	*±0.017kPa*
Electrical Tests			
31.5 Hz to 20 kHz	*±0.12dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

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Sound Calibrator
IEC 60942-2004

Calibration Certificate

Calibration Number C17249

Client Details Global Acoustics Pty Ltd
12/16 Huntingdale Drive
Thornton NSW 2322

Equipment Tested/ Model Number : Pulsar 106
Instrument Serial Number : 74813

Atmospheric Conditions
Ambient Temperature : 24.3°C
Relative Humidity : 38.9%
Barometric Pressure : 99.96kPa

Calibration Technician : Vicky Jaiswal
Calibration Date : 05/06/2017
Secondary Check: Nick Williams
Report Issue Date : 06/06/2017

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
5.2.2: Generated Sound Pressure Level	*Pass*	5.3.2: Frequency Generated	*Pass*
5.2.3: Short Term Fluctuation	*Pass*	5.5: Total Distortion	*Pass*

	Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
Measured Output	94.0	1000.0	93.8	1000.33

The sound calibrator has been shown to conform to the class 2 requirements for periodic testing, described in Annex B of IEC 60942:2004 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed..

Least Uncertainties of Measurement -

Specific Tests		Environmental Conditions	
Generated SPL	*±0.11dB*	*Temperature*	*±0.05°C*
Short Term Fluct.	*±0.02dB*	*Relative Humidity*	*±0.46%*
Frequency	*±0.01%*	*Barometric Pressure*	*±0.017kPa*
Distortion	*±0.5%*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

NATA
WORLD RECOGNISED ACCREDITATION

This calibration certificate is to be read in conjunction with the calibration test report.

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PAGE 1 OF 1

Borg Panels Facility

Construction Noise Monitoring

Quarter 4 2018

Prepared for

Borg Construction Pty Ltd

Global Acoustics

Noise and Vibration Analysis and Solutions

Global Acoustics Pty Ltd
PO Box 3115 | Thornton NSW 2322
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Email global@globalacoustics.com.au
ABN 94 094 985 734

Borg Panels Facility

Quarter 4 2018
Construction Noise Monitoring

Reference: 18389_R01
Report date: 21 November 2018

Prepared for
Borg Construction Pty Ltd
124 Lowes Mount Road
Oberon 2787 NSW

Prepared by
Global Acoustics Pty Ltd
PO Box 3115
Thornton NSW 2322

Prepared:	Amanda Borserio Consultant	QA Review:	Robert Kirwan Consultant

Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire

EXECUTIVE SUMMARY

Global Acoustics was engaged by Borg Construction Pty Ltd to undertake attended noise monitoring at sites around the Borg panel manufacturing facility (Borg) at Oberon, NSW.

The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Construction Noise Management Plan (CNMP).

Attended environmental noise monitoring described in this report was undertaken during the day period on 14 November 2018. There were 4 attended monitoring locations as listed in Table 1.1 and shown in Figure 1.

Attended monitoring was conducted in general accordance with Australian Standard AS 1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements.

Borg operations complied with the relevant noise limits during the Quarter 4 2018 survey at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Global Acoustics Pty Ltd

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Appendices

1 INTRODUCTION

1.1 Background

Global Acoustics was engaged by Borg Construction Pty Ltd to undertake attended noise monitoring at sites around the Borg panel manufacturing facility (Borg) at Oberon, NSW.

The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Construction Noise Management Plan (CNMP).

Attended environmental noise monitoring described in this report was undertaken during the day period on 14 November 2018.

1.2 Monitoring Locations

There were 4 attended monitoring locations as listed in Table 1.1 and shown in Figure 1.

Table 1.1: ATTENDED MONITORING LOCATIONS

Report Descriptor	Monitoring Location
NM1	Oberon Caravan Park
NM2	Intersection of Pine Street and Herborn Street
NM3	127 Hazelgrove Road
NM4	Intersection of Tasman Street and Earl Street

Figure 1: Attended Noise Monitoring Locations

1.3 Terminology & Abbreviations

Some definitions of terms and abbreviations, which may be used in this report, are provided in Table 1.2.

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
L_A	The A-weighted root mean squared (RMS) noise level at any instant
L_{Amax}	The maximum A-weighted noise level over a time period or for an event
L_{A1}	The noise level which is exceeded for 1 per cent of the time
$L_{A1,1minute}$	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute
L_{A10}	The noise level which is exceeded for 10 percent of the time, which is approximately the average of the maximum noise levels
L_{A50}	The noise level which is exceeded for 50 per cent of the time
L_{A90}	The level exceeded for 90 percent of the time, which is approximately the average of the minimum noise levels. The L_{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes
L_{Amin}	The minimum A-weighted noise level over a time period or for an event
L_{Aeq}	The average noise energy during a measurement period
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise
SPL	Sound pressure level (SPL), fluctuations in pressure measured as 10 times a logarithmic scale, the reference pressure being 20 micropascals
Hertz (Hz)	Cycles per second, the frequency of fluctuations in pressure, sound is usually a combination of many frequencies together
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude. Estimated from wind speed and sigma theta data
IA	Inaudible. When site-only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
NM	Not Measurable. If site-only noise is noted as NM, this means some noise from the source of interest was audible at low-levels, but could not be quantified
Day	This is the period 7:00am to 6:00pm
Evening	This is the period 6:00pm to 10:00pm
Night	This is the period 10:00pm to 7:00am

2 CONSENT AND CRITERIA

All monitoring reported in this document has been carried out in general accordance with the Development Consent (the Consent) dated 29 May 2017 (SSD 7016) and the CNMP.

2.1 Development Consent and Project Specific Criteria

The sections of the Consent relating to noise are reproduced in Appendix A.

Table 2 in Schedule B of the Consent outlines the day, evening and night period impact assessment criteria, which have been reproduced in Table 2.1 below.

Table 2.1: IMPACT ASSESSMENT CRITERIA

Location	Day $L_{Aeq,15minute}$ dB	Evening $L_{Aeq,15minute}$ dB	Night $L_{Aeq,15minute}$ dB
All sensitive receivers	55	50	45

As described in the Consent, noise generated by Borg is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy (INP), as follows:

- during rain and wind speeds greater than 3 metres/second at 10 metres above ground level; or
- stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- stability category G temperature inversion conditions.

2.2 Project Specific Noise Limits

In accordance with the Consent and CNMP, project specific noise criteria for each monitoring location are detailed in Table 2.2 and Table 2.3.

Table 2.2: GENERAL CONSTRUCTION NOISE LIMITS

Report Descriptor	Day $L_{Aeq,15minute}$ dB	Evening $L_{Aeq,15minute}$ dB	Night $L_{Aeq,15minute}$ dB
NM1	55	50	45
NM2	55	50	45
NM3	55	50	45
NM4	55	50	45

Table 2.3: ROCK / CONCRETE BREAKING NOISE LIMITS

Report Descriptor	Day $L_{Aeq,15minute}$ dB
NM1	75
NM2	75
NM3	75
NM4	75

3 METHODOLOGY

3.1 Overview

All noise monitoring was conducted at locations representative of the nearest residences in accordance with Australian Standard AS1055 ' Acoustics, Description and Measurement of Environmental Noise', relevant NSW EPA requirements, the Consent and CNMP.

Meteorological data was obtained from the Borg weather station in Oberon. This data allowed correlation of atmospheric parameters and measured noise levels. Atmospheric condition measurement at ground level was also undertaken during attended monitoring.

3.2 Attended Noise Monitoring

Attended monitoring is preferred to the use of noise loggers when determining compliance with prescribed limits as it allows the most accurate determination of the contribution, if any, to measured noise levels by the source of interest, in this case Borg. The duration of each individual measurement was 15 minutes.

If the exact contribution of the source of interest cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise levels, for example, L_{A10}, L_{A50} or L_{A90}. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also be used in this report. When site noise is noted as IA, no site noise was audible at the monitoring location. When site noise is noted as NM, this means some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (e.g. measure closer and back calculate) to determine a value for reporting.

Therefore, all sites noted as NM in this report are due to one or more of the following reasons:

- site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- it was not feasible or reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, rough terrain preventing closer measurement, addition/removal of significant source to receiver shielding caused by moving closer, and meteorological conditions where back calculation may not be accurate.

3.3 Monitoring Equipment

The equipment used to measure environmental noise levels is detailed in Table 3.1. Calibration certificates are provided in Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level analyser	701424	05/06/2019
Pulsar 106 acoustic calibrator	74813	05/06/2019

4 RESULTS

4.1 Total Measured Noise Levels

Total noise levels measured at each location are provided in Table 4.1.

Table 4.1: MEASURED NOISE LEVELS – QUARTER 4 2018[1]

Location	Start Date and Time	L_{Amax} dB	L_{A1} dB	L_{A10} dB	L_{A50} dB	L_{Aeq} dB	L_{A90} dB	L_{Amin} dB
NM1	14/11/2018 10:40	75	59	53	51	52	49	47
NM2	14/11/2018 10:07	59	53	50	47	48	46	43
NM3	14/11/2018 11:51	60	53	44	34	41	31	29
NM4	14/11/2018 11:26	72	62	55	50	53	44	36

Notes: 1. Levels in this table are not necessarily the result of activity at Borg.

4.2 Attended Noise Monitoring Results

Table 4.2 compares measured $L_{Aeq,15minute}$ levels from Borg with the Consent and CNMP noise criteria.

Table 4.2: $L_{Aeq,15minute}$ GENERATED BY BORG AGAINST CRITERIA – QUARTER 4 2018

Location	Start Date and Time	Wind Speed m/s[1]	Stability Class[1]	VTG °C per 100m[1]	Criterion dB	Criterion Applies?[2,3]	Borg $L_{Aeq,15min}$ dB[4]	Exceedance [5,6]
NM1	14/11/2018 10:40	2.6	C	-1.6	55	Yes	45	Nil
NM2	14/11/2018 10:07	1.3	C	-1.6	55	Yes	47	Nil
NM3	14/11/2018 11:51	2.5	A	-2.0	55	Yes	30	Nil
NM4	14/11/2018 11:26	2.8	D	-1.0	55	Yes	45	Nil

Notes:

1. *Atmospheric data is sourced from Borg weather station in Oberon;*
2. *In accordance with EPL and PA, the noise criteria are to apply under all meteorological conditions except the following:*
   - *Wind speeds greater than 3 m/s at 10 metres above ground level; or*
   - *Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or*
   - *Stability class G temperature inversion conditions.*
3. *Criterion may or may not apply due to rounding of meteorological data values;*
4. *Estimated or measured $L_{Aeq,15minute}$ attributed to the Borg;*
5. *Bold results in red indicate exceedance of criteria (if applicable); and*
6. *NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable.*

4.3 Atmospheric Conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.3. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain or hail.

Table 4.3: MEASURED ATMOSPHERIC CONDITIONS – QUARTER 4 2018

Location	Start Date and Time	Temperature (degrees)	Wind Speed (m/s)	Wind Direction[1]	Cloud Cover (1/8s)
NM1	14/11/2018 10:40	17	1.3	310	8
NM2	14/11/2018 10:07	17	0.8	270	8
NM3	14/11/2018 11:51	18	0.7	20	8
NM4	14/11/2018 11:26	19	0.5	350	8

Notes:

1. *"-" indicates calm conditions at 1.8 metres.*

5 SUMMARY

Global Acoustics was engaged by Borg Construction Pty Ltd to undertake attended noise monitoring at sites around the Borg panel manufacturing facility at Oberon, NSW.

The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Construction Noise Management Plan.

Attended environmental noise monitoring described in this report was undertaken during the day period on 14 November 2018.

Borg operations complied with the relevant criteria during the Quarter 4 2018 survey at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Global Acoustics Pty Ltd

APPENDIX

A STATUTORY REQUIREMENTS

A.1 BORG PANELS FACILITY DEVELOPMENT CONSENT

NOISE

Hours of Work

B13. The Applicant must comply with the hours detailed in **Table 1**, unless otherwise agreed in writing by the Secretary.

Table 1: Hours of Work

Activity	Day	Time
Earthworks and Construction	Monday – Friday Saturday	7 am to 7 pm 8 am to 1 pm
Operation	Monday – Sunday	24 hours

B14. Works outside of the hours identified in Condition B13 may be undertaken in the following circumstances:
(a) works that are inaudible at the nearest sensitive receivers;
(b) works agreed to in writing by the Secretary;
(c) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or
(d) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

Construction Noise Management Plan

B15. The Applicant must prepare a Construction Noise Management Plan (CNMP) for the Project to manage construction noise. The plan must form part of the CEMP required by Condition C1 and must:
(a) be prepared by a suitably qualified and experienced noise expert;
(b) be approved by the Secretary prior to the commencement of construction of the Project;
(c) describe procedures for achieving the noise limits in **Table 2**;
(d) describe the measures to be implemented to manage noisy works such as rock/concrete breaking activities, in close proximity to sensitive receivers;
(e) include strategies that have been developed with the community for managing noisy works;
(f) describe the community consultation undertaken to develop the strategies in e) above; and
(g) include a complaints management system that would be implemented for the duration of the Project.

Operational Noise Limits

B16. The Applicant must ensure that noise generated by the Development does not exceed the noise limits in **Table 2.**

Table 2: Noise Limits dB(A)

Location	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$	Night $L_{Aeq(15\ minute)}$
All sensitive receivers	55	50	45

Note: *Noise generated by the Development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.*

Noise Mitigation

B17. The Applicant must ensure all noise attenuation measures already installed for the Existing Development are maintained in good working order for the life of the Development.

Operational Noise Management Plan

B18. Within 6 months of the date of this consent, the Applicant must prepare an Operational Noise Management Plan (ONMP) for the Existing Development, to manage operational noise to the satisfaction of the Secretary. The ONMP must form part of the OEMP required by Condition C4 and be prepared in accordance with Condition C9. The ONMP must:
(a) be prepared by a suitably qualified and experienced noise expert;
(b) describe the measures that will be implemented to minimise noise from the Existing Development including:
(i) all reasonable and feasible measures being employed on site;
(ii) maintain equipment to ensure it is in good order;
(iii) traffic noise is effectively managed;
(iv) the noise impacts of the Existing Development are minimised during any meteorological conditions when the noise criteria in this consent do not apply;
(v) compliance with the relevant conditions of this consent;
(c) includes a noise monitoring program that:
(i) must be carried out until otherwise agreed to in writing by the Secretary;
(ii) is capable of evaluating the performance of the Existing Development; and
(iii) includes a protocol for determining exceedances of the relevant conditions of this consent and responding to complaints; and
(d) include a procedure for implementing noise mitigation measures, should the Applicant be directed by the EPA or the Secretary, or should non-compliances be detected.

B19. Prior to the commencement of operation of the Project, the Applicant must update the ONMP required under Condition B18, to incorporate the Project and its management, to the satisfaction of the Secretary. The updated plan must be prepared in accordance with the requirements of Condition B18, and must incorporate the following:
(a) description of the noise monitoring program to measure the performance of the Development against this consent and the EPL; and
(b) description of any additional measures that would be implemented for the Development to ensure compliance with the noise limits in Condition B16 and the EPL.

Noise Verification

B20. Within 3 months of commencement of operation of the Project, the Applicant must undertake a noise verification study for the Development to the satisfaction of the Secretary. The study must:
(a) be undertaken by a suitably qualified expert;
(b) include an analysis of compliance with noise limits specified in Condition B16;
(c) demonstrate achievement of the sound power levels in Table 12 of the *Borg Panels Timber Panel Processing Facility Noise and Vibration Impact Assessment*, dated May 2016 and prepared by Global Acoustics;
(d) include an outline of management actions to be taken to address any exceedances of the limits specified in Condition B16; and
(e) describe the contingency measures in the event management actions are not effective in reducing noise levels to an acceptable level.

Within 1 month of completing the study, the Applicant must submit a report outlining the findings of the study to the Secretary and the EPA.

B21. Should the noise verification study indicate the Development has not complied with the noise limits in Condition B16 and applicable EPL requirements, or where the verification indicates that greater impacts than predicted in the EIS may arise, a detailed investigation and an outline of any management measures necessary to prevent exceedances must be submitted to the Secretary and the EPA, as part of the study.

Borg will implement reasonable and practical measures to avoid or minimise impacts to the environment that may arise as a result of the project.

Borg will carry out the proposed works in accordance with the EIS, RTS and the approval conditions.

Noise

Attenuation, as detailed in the NIA, will be implemented as follows:

- Conti 1 Dryer Fan air intake redesigned and the fan speed reduced to minimise noise generated. A sound power reduction from LAeq 121 dB to 114 dB or better is required.
- Booster fan will receive additional insulation and a reduction in fan speed. A sound power reduction from LAeq 116 dB to 109 dB or better is required.
- Main fibre transport fan will have a concrete enclosure constructed around it. A sound power reduction from LAeq 110 dB to 104 dB or better is required.

In short, the approach taken by Borg to mitigate noise is based on a number of factors:

1. Continuation of the use of mobile chippers (that is, not to enclose the mobile chippers). However, these are backup items (only to be used when enclosed, electric chippers are not operational), and will not be used in enhancing met conditions.
2. Implementation of additional noise mitigation measures to minimise noise generated by equipment, as detailed above.
3. Provision of sound attenuation structures and enclosures to other equipment where appropriate.

Irrespective of the above, Borg undertakes to meet the existing plant sound power reductions specified in the NIA. If the proposed attenuation measures to the existing plant are found to be insufficient in achieving these reductions, additional works will be undertaken.

APPENDIX

B CALIBRATION CERTIFICATES

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Level 7 Building 2 423 Pennant Hills Rd
Pennant Hills NSW AUSTRALIA 2120
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3.2013

Calibration Certificate

Calibration Number C17248

Client Details Global Acoustics Pty Ltd
12/16 Huntingdale Drive
Thornton NSW 2322

Equipment Tested/ Model Number : Rion NA-28
Instrument Serial Number : 00701424
Microphone Serial Number : 01916
Pre-amplifier Serial Number : 01463

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	24.3°C	Ambient Temperature :	24.4°C
Relative Humidity :	40%	Relative Humidity :	39.5%
Barometric Pressure :	100.05kPa	Barometric Pressure :	100kPa

Calibration Technician : Vicky Jaiswal
Calibration Date : 05/06/2017
Secondary Check: Nick Williams
Report Issue Date : 06/06/2017

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*Pass*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	*±0.16dB*	*Temperature*	*±0.05°C*
12.5kHz	*±0.2dB*	*Relative Humidity*	*±0.46%*
16kHz	*±0.29dB*	*Barometric Pressure*	*±0.017kPa*
Electrical Tests			
31.5 Hz to 20 kHz	*±0.12dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

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Sound Calibrator
IEC 60942-2004
Calibration Certificate

Calibration Number C17249

Client Details Global Acoustics Pty Ltd
12/16 Huntingdale Drive
Thornton NSW 2322

Equipment Tested/ Model Number : Pulsar 106
Instrument Serial Number : 74813

Atmospheric Conditions
Ambient Temperature : 24.3°C
Relative Humidity : 38.9%
Barometric Pressure : 99.96kPa

Calibration Technician : Vicky Jaiswal
Calibration Date : 05/06/2017
Secondary Check: Nick Williams
Report Issue Date : 06/06/2017

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
5.2.2: Generated Sound Pressure Level	*Pass*	5.3.2: Frequency Generated	*Pass*
5.2.3: Short Term Fluctuation	*Pass*	5.5: Total Distortion	*Pass*

	Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
Measured Output	94.0	1000.0	93.8	1000.33

The sound calibrator has been shown to conform to the class 2 requirements for periodic testing, described in Annex B of IEC 60942:2004 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed..

Least Uncertainties of Measurement -

Specific Tests		Environmental Conditions	
Generated SPL	*±0.11dB*	*Temperature*	*±0.05°C*
Short Term Fluct.	*±0.02dB*	*Relative Humidity*	*±0.46%*
Frequency	*±0.01%*	*Barometric Pressure*	*±0.017kPa*
Distortion	*±0.5%*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

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Borg Panels Facility

Construction Noise Monitoring

Quarter 1 2019

Prepared for

Borg Construction Pty Ltd

Global Acoustics

Noise and Vibration Analysis and Solutions

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ABN 94 094 985 734

Borg Panels Facility

Quarter 1 2019
Construction Noise Monitoring

Reference: 19058_R01
Report date: 30 April 2019

Prepared for
Borg Construction Pty Ltd
124 Lowes Mount Road
Oberon 2787 NSW

Prepared by
Global Acoustics Pty Ltd
PO Box 3115
Thornton NSW 2322

Prepared:	Robert Kirwan Consultant	QA Review:	Ryan Bruniges Consultant

Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire

EXECUTIVE SUMMARY

Global Acoustics was engaged by Borg Construction Pty Ltd to undertake attended noise monitoring at sites around the Borg panel manufacturing facility (Borg) at Oberon, NSW.

The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Construction Noise Management Plan (CNMP).

Attended environmental noise monitoring described in this report was undertaken during the day period on 28 March 2019. There were 4 attended monitoring locations as listed in Table 1.1 and shown in Figure 1.

Attended monitoring was conducted in general accordance with Australian Standard AS 1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements.

Borg operations complied with the relevant noise limits during the Quarter 1 2019 survey at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Global Acoustics Pty Ltd

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Appendices

1 INTRODUCTION

1.1 Background

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The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Construction Noise Management Plan (CNMP).

Attended environmental noise monitoring described in this report was undertaken during the day period on 28 March 2019.

1.2 Monitoring Locations

There were 4 attended monitoring locations as listed in Table 1.1 and shown in Figure 1.

Table 1.1: ATTENDED MONITORING LOCATIONS

Report Descriptor	Monitoring Location
NM1	Oberon Caravan Park
NM2	Intersection of Pine Street and Herborn Street
NM3	127 Hazelgrove Road
NM4	Intersection of Tasman Street and Earl Street

Figure 1: Attended Noise Monitoring Locations

1.3 Terminology & Abbreviations

Some definitions of terms and abbreviations, which may be used in this report, are provided in Table 1.2.

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
L_A	The A-weighted root mean squared (RMS) noise level at any instant
L_{Amax}	The maximum A-weighted noise level over a time period or for an event
L_{A1}	The noise level which is exceeded for 1 per cent of the time
$L_{A1,1minute}$	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute
L_{A10}	The noise level which is exceeded for 10 percent of the time, which is approximately the average of the maximum noise levels
L_{A50}	The noise level which is exceeded for 50 per cent of the time
L_{A90}	The level exceeded for 90 percent of the time, which is approximately the average of the minimum noise levels. The L_{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes
L_{Amin}	The minimum A-weighted noise level over a time period or for an event
L_{Aeq}	The average noise energy during a measurement period
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise
SPL	Sound pressure level (SPL), fluctuations in pressure measured as 10 times a logarithmic scale, the reference pressure being 20 micropascals
Hertz (Hz)	Cycles per second, the frequency of fluctuations in pressure, sound is usually a combination of many frequencies together
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude. Estimated from wind speed and sigma theta data
IA	Inaudible. When site-only noise is noted as IA, there was no noise from the source of interest audible at the monitoring location
NM	Not Measurable. If site-only noise is noted as NM, this means some noise from the source of interest was audible at low-levels, but could not be quantified
Day	This is the period 7:00am to 6:00pm
Evening	This is the period 6:00pm to 10:00pm
Night	This is the period 10:00pm to 7:00am

2 CONSENT AND CRITERIA

All monitoring reported in this document has been carried out in general accordance with the Development Consent (the Consent) dated 29 May 2017 (SSD 7016) and the CNMP.

2.1 Development Consent and Project Specific Criteria

The sections of the Consent relating to noise are reproduced in Appendix A.

Table 2 in Schedule B of the Consent outlines the day, evening and night period impact assessment criteria, which have been reproduced in Table 2.1 below.

Table 2.1: IMPACT ASSESSMENT CRITERIA

Location	Day $L_{Aeq,15minute}$ dB	Evening $L_{Aeq,15minute}$ dB	Night $L_{Aeq,15minute}$ dB
All sensitive receivers	55	50	45

As described in the Consent, noise generated by Borg is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy (INP), as follows:

- during rain and wind speeds greater than 3 metres/second at 10 metres above ground level; or
- stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- stability category G temperature inversion conditions.

2.2 Project Specific Noise Limits

In accordance with the Consent and CNMP, project specific noise criteria for each monitoring location are detailed in Table 2.2 and Table 2.3.

Table 2.2: GENERAL CONSTRUCTION NOISE LIMITS

Report Descriptor	Day $L_{Aeq,15minute}$ dB	Evening $L_{Aeq,15minute}$ dB	Night $L_{Aeq,15minute}$ dB
NM1	55	50	45
NM2	55	50	45
NM3	55	50	45
NM4	55	50	45

Table 2.3: ROCK / CONCRETE BREAKING NOISE LIMITS

Report Descriptor	Day $L_{Aeq,15minute}$ dB
NM1	75
NM2	75
NM3	75
NM4	75

2.3 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017, and supersedes the EPA's Industrial Noise Policy (INP, 2000). Assessment and reporting of modifying factors is to be carried out in accordance with Fact Sheet C of the NPfI.

NPfI modifying factors, as they are applicable to mining noise, are described in more detail below.

2.3.1 Tonality and Intermittent Noise

As defined in the NPfI:

> *Tonal noise contains a prominent frequency and is characterised by a definite pitch.*
>
> *Intermittent noise is noise where the level suddenly drops/increases several times during the assessment period, with a noticeable change in source noise level of at least 5 dB(A); for example, equipment cycling on and off. The intermittency correction is not intended to be applied to changes in noise level due to meteorology.*

2.3.2 Low-Frequency Noise

As defined in the NPfI:

> *Low frequency noise is noise with an unbalanced spectrum and containing major components within the low-frequency range (10 – 160 Hz) of the frequency spectrum.*

The NPfI contains the current method of assessing low-frequency noise, which is a 2 step process as detailed below:

> *Measure/assess source contribution C-weighted and A-weighted L_{eq},T levels over the same time period. The low frequency noise modifying factor correction is to be applied where the C-A level is 15 dB or more and:*
>
> - *where any of the 1/3 octave noise levels in Table C2 are exceeded by **up to and including** 5 dB and cannot be mitigated, a 2 dBA positive adjustment to measured A weighted levels applies for the evening/night period; and*
>
> - *where any of the 1/3 octave noise levels in Table C2 are exceeded by **more than** 5 dB and cannot be mitigated, a 5 dBA positive adjustment to measured A weighted levels applies for the evening/night period and a 2 dBA positive adjustment applies for the daytime period.*

Table C2 and associated notes from the NPfI is reproduced below:

Table C2: One-third octave low-frequency noise thresholds.

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

Notes:

- dB(Z) = decibel (Z frequency weighted).
- For the assessment of low-frequency noise, care should be taken to select a wind screen that can protect the microphone from wind-induced noise characteristics at least 10 dB below the threshold values in Table C2 for wind speeds up to 5 metres per second. It is likely that high performance larger diameter wind screens (nominally 175 mm) will be required to achieve this performance (Hessler, 2008). In any case, the performance of the wind screen and wind speeds at which data will be excluded needs to be stated.
- Low-frequency noise corrections only apply under the standard and/or noise-enhancing meteorological conditions.
- Where a receiver location has had architectural acoustic treatment applied (including alternative means of mechanical ventilation satisfying the Building Code of Australia) by a proponent, as part of consent requirements or as a private negotiated agreement, alternative external low-frequency noise assessment criteria may be proposed to account for the higher transmission loss of the building façade.
- Measurements should be made between 1.2 and 1.5 metres above ground level unless otherwise approved through a planning instrument (consent/approval) or environment protection licence, and at locations nominated in the development consent or licence.

3 METHODOLOGY

3.1 Overview

All noise monitoring was conducted at locations representative of the nearest residences in accordance with Australian Standard AS1055 ' Acoustics, Description and Measurement of Environmental Noise', relevant NSW EPA requirements, the Consent and CNMP.

Meteorological data was obtained from the Borg weather station in Oberon. This data allowed correlation of atmospheric parameters and measured noise levels. Atmospheric condition measurement at ground level was also undertaken during attended monitoring.

3.2 Attended Noise Monitoring

Attended monitoring is preferred to the use of noise loggers when determining compliance with prescribed limits as it allows the most accurate determination of the contribution, if any, to measured noise levels by the source of interest, in this case Borg. The duration of each individual measurement was 15 minutes.

If the exact contribution of the source of interest cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise levels, for example, L_{A10}, L_{A50} or L_{A90}. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also be used in this report. When site noise is noted as IA, no site noise was audible at the monitoring location. When site noise is noted as NM, this means some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods as per the NPfI (e.g. measure closer and back calculate) to determine a value for reporting.

Therefore, all sites noted as NM in this report are due to one or more of the following reasons:

- site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- it was not feasible or reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, rough terrain preventing closer measurement, addition/removal of significant source to receiver shielding caused by moving closer, and meteorological conditions where back calculation may not be accurate.

3.3 Modifying Factors

Years of monitoring have indicated that noise levels from the facility, particularly those measured at significant distances from the source are relatively continuous and broad spectrum. Given this, noise levels from Borg at the monitoring locations are unlikely to be intermittent or tonal.

Assessment of low-frequency modifying factors is necessary when application of the maximum correction could potentially result in an exceedance of the relevant site-only L_{Aeq} criterion. Low-frequency analysis is therefore undertaken for measurements in this report where:

- meteorological conditions resulted in criteria being applicable;
- contributions from Borg were audible and directly measurable, such that the site-only L_{Aeq} was not "NM" or less than a maximum cut off value (e.g. "<20 dB" or "<30dB");
- contributions from Borg were within 5 dB of the relevant L_{Aeq} criterion, as 5 dB is the maximum penalty that can be applied by low-frequency modifying factors; and
- Borg was the only low-frequency noise source.

All measurements meeting these conditions were evaluated for possible low-frequency penalty applicability in accordance with the NPfI.

3.4 Monitoring Equipment

The equipment used to measure environmental noise levels is detailed in Table 3.1. Calibration certificates are provided in Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level analyser	370304	26/11/2020
Pulsar 106 acoustic calibrator	81334	22/11/2020

4 RESULTS

4.1 Total Measured Noise Levels

Total noise levels measured at each location are provided in Table 4.1.

Table 4.1: MEASURED NOISE LEVELS – QUARTER 1 2019[1]

Location	Start Date and Time	L_{Amax} dB	L_{A1} dB	L_{A10} dB	L_{A50} dB	L_{Aeq} dB	L_{A90} dB	L_{Amin} dB
NM1	28/3/19 12:33	74	64	57	50	54	45	42
NM2	28/3/19 12:12	61	56	48	44	46	43	40
NM3	28/3/19 11:26	80	70	53	42	56	40	37
NM4	28/3/19 11:46	76	68	53	44	54	43	41

Notes: 1. Levels in this table are not necessarily the result of activity at Borg.

4.2 Modifying Factors

Measured Borg only levels were assessed for the applicability of modifying factors in accordance with the EPA's NPfI.

There were no intermittent or tonal noise sources, as defined in the NPfI, audible from site during the survey. None of the measurements satisfied the conditions outlined in Section 3.3 when assessing low-frequency noise.

Therefore no further assessment of modifying factors was undertaken.

4.3 Attended Noise Monitoring Results

Table 4.2 compares measured $L_{Aeq,15minute}$ levels from Borg with the Consent and CNMP noise criteria.

Table 4.2: $L_{Aeq,15minute}$ GENERATED BY BORG AGAINST CRITERIA – QUARTER 1 2019

Location	Start Date and Time	Wind Speed m/s[1]	Stability Class[1]	VTG °C per 100m[1]	Criterion dB	Criterion Applies?[2,3]	Borg $L_{Aeq,15min}$ dB[4]	Exceedance [5,6]
NM1	28/3/19 12:33	1.3	A	-2.0	55	Yes	NM	Nil
NM2	28/3/19 12:12	1.5	A	-2.0	55	Yes	NM	Nil
NM3	28/3/19 11:26	1.6	A	-2.0	55	Yes	<35	Nil
NM4	28/3/19 11:46	1.4	A	-2.0	55	Yes	<35	Nil

Notes:

1. *Atmospheric data is sourced from Borg weather station in Oberon;*
2. *In accordance with EPL and PA, the noise criteria are to apply under all meteorological conditions except the following:*
   - *Wind speeds greater than 3 m/s at 10 metres above ground level; or*
   - *Stability class F temperature inversion conditions, and wind speeds greater than 2 m/s at 10 metres above ground level; or*
   - *Stability class G temperature inversion conditions.*
3. *Criterion may or may not apply due to rounding of meteorological data values;*
4. *Estimated or measured $L_{Aeq,15minute}$ attributed to the Borg;*
5. *Bold results in red indicate exceedance of criteria (if applicable); and*
6. *NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable.*

4.4 Atmospheric Conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.3. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain or hail.

Table 4.3: MEASURED ATMOSPHERIC CONDITIONS – QUARTER 1 2019

Location	Start Date and Time	Temperature (degrees)	Wind Speed (m/s)	Wind Direction[1]	Cloud Cover (1/8s)
NM1	28/3/19 12:33	24	0.6	330	4
NM2	28/3/19 12:12	25	0.4	140	4
NM3	28/3/19 11:26	21	0.5	230	2
NM4	28/3/19 11:46	23	0.5	200	3

Notes:

1. *"-" indicates calm conditions at 1.8 metres.*

5 SUMMARY

Global Acoustics was engaged by Borg Construction Pty Ltd to undertake attended noise monitoring at sites around the Borg panel manufacturing facility at Oberon, NSW.

The survey purpose was to quantify and describe the acoustic environment around the site and compare results with limits specified in the Development Consent and Construction Noise Management Plan.

Attended environmental noise monitoring described in this report was undertaken during the day period on 28 March 2019.

Borg operations complied with the relevant criteria during the Quarter 1 2019 survey at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

Global Acoustics Pty Ltd

APPENDIX

A STATUTORY REQUIREMENTS

A.1 BORG PANELS FACILITY DEVELOPMENT CONSENT

NOISE

Hours of Work

B13. The Applicant must comply with the hours detailed in **Table 1**, unless otherwise agreed in writing by the Secretary.

Table 1: Hours of Work

Activity	Day	Time
Earthworks and Construction	Monday – Friday Saturday	7 am to 7 pm 8 am to 1 pm
Operation	Monday – Sunday	24 hours

B14. Works outside of the hours identified in Condition B13 may be undertaken in the following circumstances:
(a) works that are inaudible at the nearest sensitive receivers;
(b) works agreed to in writing by the Secretary;
(c) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or
(d) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

Construction Noise Management Plan

B15. The Applicant must prepare a Construction Noise Management Plan (CNMP) for the Project to manage construction noise. The plan must form part of the CEMP required by Condition C1 and must:
(a) be prepared by a suitably qualified and experienced noise expert;
(b) be approved by the Secretary prior to the commencement of construction of the Project;
(c) describe procedures for achieving the noise limits in **Table 2**;
(d) describe the measures to be implemented to manage noisy works such as rock/concrete breaking activities, in close proximity to sensitive receivers;
(e) include strategies that have been developed with the community for managing noisy works;
(f) describe the community consultation undertaken to develop the strategies in e) above; and
(g) include a complaints management system that would be implemented for the duration of the Project.

Operational Noise Limits

B16. The Applicant must ensure that noise generated by the Development does not exceed the noise limits in **Table 2.**

Table 2: Noise Limits dB(A)

Location	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$	Night $L_{Aeq(15\ minute)}$
All sensitive receivers	55	50	45

Note: *Noise generated by the Development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.*

Noise Mitigation

B17. The Applicant must ensure all noise attenuation measures already installed for the Existing Development are maintained in good working order for the life of the Development.

Operational Noise Management Plan

B18. Within 6 months of the date of this consent, the Applicant must prepare an Operational Noise Management Plan (ONMP) for the Existing Development, to manage operational noise to the satisfaction of the Secretary. The ONMP must form part of the OEMP required by Condition C4 and be prepared in accordance with Condition C9. The ONMP must:
(a) be prepared by a suitably qualified and experienced noise expert;
(b) describe the measures that will be implemented to minimise noise from the Existing Development including:
(i) all reasonable and feasible measures being employed on site;
(ii) maintain equipment to ensure it is in good order;
(iii) traffic noise is effectively managed;
(iv) the noise impacts of the Existing Development are minimised during any meteorological conditions when the noise criteria in this consent do not apply;
(v) compliance with the relevant conditions of this consent;
(c) includes a noise monitoring program that:
(i) must be carried out until otherwise agreed to in writing by the Secretary;
(ii) is capable of evaluating the performance of the Existing Development; and
(iii) includes a protocol for determining exceedances of the relevant conditions of this consent and responding to complaints; and
(d) include a procedure for implementing noise mitigation measures, should the Applicant be directed by the EPA or the Secretary, or should non-compliances be detected.

B19. Prior to the commencement of operation of the Project, the Applicant must update the ONMP required under Condition B18, to incorporate the Project and its management, to the satisfaction of the Secretary. The updated plan must be prepared in accordance with the requirements of Condition B18, and must incorporate the following:
(a) description of the noise monitoring program to measure the performance of the Development against this consent and the EPL; and
(b) description of any additional measures that would be implemented for the Development to ensure compliance with the noise limits in Condition B16 and the EPL.

Noise Verification

B20. Within 3 months of commencement of operation of the Project, the Applicant must undertake a noise verification study for the Development to the satisfaction of the Secretary. The study must:
(a) be undertaken by a suitably qualified expert;
(b) include an analysis of compliance with noise limits specified in Condition B16;
(c) demonstrate achievement of the sound power levels in Table 12 of the *Borg Panels Timber Panel Processing Facility Noise and Vibration Impact Assessment*, dated May 2016 and prepared by Global Acoustics;
(d) include an outline of management actions to be taken to address any exceedances of the limits specified in Condition B16; and
(e) describe the contingency measures in the event management actions are not effective in reducing noise levels to an acceptable level.

Within 1 month of completing the study, the Applicant must submit a report outlining the findings of the study to the Secretary and the EPA.

B21. Should the noise verification study indicate the Development has not complied with the noise limits in Condition B16 and applicable EPL requirements, or where the verification indicates that greater impacts than predicted in the EIS may arise, a detailed investigation and an outline of any management measures necessary to prevent exceedances must be submitted to the Secretary and the EPA, as part of the study.

Borg will implement reasonable and practical measures to avoid or minimise impacts to the environment that may arise as a result of the project.

Borg will carry out the proposed works in accordance with the EIS, RTS and the approval conditions.

Noise

Attenuation, as detailed in the NIA, will be implemented as follows:

- Conti 1 Dryer Fan air intake redesigned and the fan speed reduced to minimise noise generated. A sound power reduction from LAeq 121 dB to 114 dB or better is required.
- Booster fan will receive additional insulation and a reduction in fan speed. A sound power reduction from LAeq 116 dB to 109 dB or better is required.
- Main fibre transport fan will have a concrete enclosure constructed around it. A sound power reduction from LAeq 110 dB to 104 dB or better is required.

In short, the approach taken by Borg to mitigate noise is based on a number of factors:

1. Continuation of the use of mobile chippers (that is, not to enclose the mobile chippers). However, these are backup items (only to be used when enclosed, electric chippers are not operational), and will not be used in enhancing met conditions.
2. Implementation of additional noise mitigation measures to minimise noise generated by equipment, as detailed above.
3. Provision of sound attenuation structures and enclosures to other equipment where appropriate.

Irrespective of the above, Borg undertakes to meet the existing plant sound power reductions specified in the NIA. If the proposed attenuation measures to the existing plant are found to be insufficient in achieving these reductions, additional works will be undertaken.

APPENDIX

B CALIBRATION CERTIFICATES

Acoustic Research Labs Pty Ltd
Level 7 Building 2 423 Pennant Hills Rd
Pennant Hills NSW AUSTRALIA 2120
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3.2013
Calibration Certificate

Calibration Number C18618

Client Details Global Acoustics Pty Ltd
12/16 Huntingdale Drive
Thornton NSW 2322

Equipment Tested/ Model Number : Rion NA-28
Instrument Serial Number : 00370304
Microphone Serial Number : 10421
Pre-amplifier Serial Number : 60313

Pre-Test Atmospheric Conditions
Ambient Temperature : 23.6°C
Relative Humidity : 42.6%
Barometric Pressure : 98.42kPa

Post-Test Atmospheric Conditions
Ambient Temperature : 22.4°C
Relative Humidity : 42.4%
Barometric Pressure : 98.45kPa

Calibration Technician : Lucky Jaiswal
Calibration Date : 26 Nov 2018

Secondary Check: Lewis Boorman
Report Issue Date : 29 Nov 2018

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*Pass*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2013.

Least Uncertainties of Measurement -

Acoustic Tests
31.5 Hz to 8kHz ±0.12dB
12.5kHz ±0.18dB
16kHz ±0.51dB
Electrical Tests
31.5 Hz to 20 kHz ±0.12dB

Environmental Conditions
Temperature ±0.05°C
Relative Humidity ±0.46%
Barometric Pressure ±0.017kPa

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

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Sound Calibrator
IEC 60942-2017

Calibration Certificate

Calibration Number C18619

Client Details Global Acoustics Pty Ltd
12/16 Huntingdale Drive
Thornton NSW 2322

Equipment Tested/ Model Number : Pulsar Model 106
Instrument Serial Number : 81334

Atmospheric Conditions
Ambient Temperature : 24.2°C
Relative Humidity : 42.9%
Barometric Pressure : 97.69kPa

Calibration Technician : Lucky Jaiswal
Calibration Date : 22 Nov 2018
Secondary Check: Lewis Boorman
Report Issue Date : 29 Nov 2018
Approved Signatory : Ken Williams

Characteristic Tested	Result
Generated Sound Pressure Level	*Pass*
Frequency Generated	*Pass*
Total Distortion	*Pass*

	Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
Measured Output	94.0	1000.0	94.2	1000.35

The sound calibrator has been shown to conform to the class 2 requirements for periodic testing, described in Annex B of IEC 60942:2017 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Least Uncertainties of Measurement :

Specific Tests		Environmental Conditions	
Generated SPL	*±0.11dB*	*Temperature*	*±0.2°C*
Frequency	*±0.01%*	*Relative Humidity*	*±2.4%*
Distortion	*±0.48%*	*Barometric Pressure*	*±0.015kPa*

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

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Appendix G – Community Complaints

Complaint No	Category	Date Received	Property	Detail	Follow Up Actions
1	Noise	04/12/2018	Clover Lane, Oberon	Nuisance noise late evening and early morning	Noise logger placed at property. Data reviewed, no exceedances recorded. Advised resident of results. Distributed site wide Safety Alert – Approved Work Hours & Activities. Toolbox meeting held 10 December – ensure no loud noise past 7PM and to be considerate of neighbours when working during evening, night and early morning periods.
2	Noise	16/01/2019	Fox Lane, Oberon	Nuisance noise during night of 15/01/2019	Investigated work activities occurring during this timeframe and discussed with site operators who confirmed that the facility was operating at minimum capacity. Contacted resident and advised no source of noise could be identified. No further issue raised by resident.
3	Noise	16/01/2019	Clover Lane, Oberon	Nuisance noise during night of 15/01/2019 – sound of trucks beeping	Investigated work activities and discussed with site team. Trucks beeping likely reversing alarms, a safety feature that cannot be removed. Advised resident of investigation findings. Noise monitoring to date (attended and unattended, and that performed by noise consultant) has shown no exceedances of EPL L4.1 noise limits.
4	Noise	17/02/2019	Fox Lane, Oberon	Noticeable noise coming from the facility during early morning – general factory noise	Noise logger had been placed at property on 15/02/19 with data logged up to 18/02/19. Reviewed data, nil exceedance of EPL L4.1 noise limits. Advised resident. Borg environment team developed a noise training package that was delivered to all on site to raise awareness of noise nuisance impacts on our neighbours, and reaffirm site noise requirements and noise limits.

Complaint No	Category	Date Received	Property	Detail	Follow Up Actions
5	Noise	05/04/2019	Hazelgrove Road, Oberon	Constant noise coming from the facility	Investigated potential sources of noise. Found external roller doors that face Hazelgrove Road property open and so were closed. Sign installed at roller doors instructing workers that these are to remain closed. Noise logger placed at property. Data reviewed and showed nil exceedance of EPL L4.1 noise limits.

Appendix H – Community Consultation Minutes

Oberon Timber Complex

Community Consultative Committee

Minutes

Meeting: Community Consultative Committee Meeting
Venue: Borg Panels Conference Room – Chaired by Tony Truscott
Date: 20 March 2019
Time: 4.00pm
Present: Julie Booth, Tony Truscott, Victor Bendveski, Fran Charge, Tim Charge, Shane Wilson and David Knights (HPP)
Apologies: Kathy Sajowitz, Ian Gordon, Trish Gordon

Meeting opened. 4pm
Apologies submitted
Previous minutes reviewed and accepted by Fran Charge.

Site Updates

HPP Report

Computer changeover taken place with positive results

Safety

- No major issues
- Introduced Drug and Alcohol policy on site. At this time have not used random testing. Using for incident based only
- Mental Health training – workshops to be conducted
- No major safety incidents in the last quarter

Environment

- Site 1 cleaned up to remove rubbish and eyesore

Market

- Christmas shut was extended by 1 week
- Market going forward still unclear
- Website being created for HPP
- Budgets for next year underway with AKD
- 3 million capital spend mostly aimed at optimisation of recovery

Borg Panels
(Including Woodchem and Structaflor)

Safety

- Inroads into safety with over half reduction in incidents
- Meetings held to engage employees in regards to safety

Environment

- Some noise complaints on northern side
- Issue with water escaping from particle board plant

- Paul Shaddock is working with Oberon Council to create promotional material information for promotion and advertising

Particle Board Line

- Still in the commissioning stage. The Logyard and Debarker still to be finalised, when completed it will give stability to the process.
- Transfers – Additional transfers to Structaflor site to transport board to the finishing line.
- Increased efficiencies on our original lines and over next few months look to stabilize the process.
- Long term the transferring of board over to Structaflor site is not practical and will be replaced with improvements.

Victor Bendveski

- Just wanted to check there are no issues or ongoing concerns with the site
- Advice letter to be issued assuring the noise would not be an ongoing issue
- Complaint from northern neighbours around noise
- One complaint made through EPA
- (Shane Wilson) Council said that this issue seemed to be resolved
- Chip operation 75% complete work still ongoing
- High pressure cable plus gas pipe from Gate 6 to Structaflor site
- The site is looking to reuse waste heap
- Particle Board still trying to fix the little issues as they arise
- Noise measurements have been done to ensure we are within requirements.
- (Shane Wilson) Noise reduction is obvious. Seems to be since the Structaflor closure and roads are silent around 10:30 pm. No issues with roads
- Automated Activation of sprinklers at Particle Board due to a smoke issue which should have only resulted in alarm notification but also deluged with water the short comings in bunds allowed water to escape.
- Victor asked whether trucks travelling through town were causing any issues.
- (Shane Wilson) No Issues we have been made aware of – no concerns

General Business

- Proposed fitness centre being looked at for township
- (Shane Wilson) Development Application soon to be submitted for new joint venture sports oval. Few submissions presented to council with mostly concerns around what the development will be on the leagues ground and if it will increase noise.
- Fran asked if there could be an article or update on the site in the local paper for peoples interest.
- Shane asked also for prior notification for the public re the Christmas Party.

Meeting Closed: 6.00pm
Next Meeting: 19 June 2019 at 4pm

Oberon Timber Complex

Community Consultative Committee

Minutes

Meeting:	Community Consultative Committee Meeting
Venue:	Borg Panels Conference Room – Chaired by Tony Truscott
Date:	28 November 2018
Time:	4.00pm
Present:	Julie Booth, Tony Truscott, Ian Gordon, Trish Gordon, Fran Charge, Tim Charge, Shane Wilson and David Knight (HPP)
Apologies:	Brian Dellow, Kathy Sajowich

Meeting opened.
Apologies submitted
Previous minutes reviewed and accepted by Fran.

Site Updates

HPP Report

New owners

- AKD (Associated Kiln Dryers) purchased HPP from Carter Holt Harvey. Four families own this milling enterprise
- Purchased Caboolture, Tumut and 50% of HPP
- Australian business
- Not publicly listed and being family owned will have benefits
- Now run and report on 1 fiscal year not 2
- Long term investment and people orientated
- Busy year with the Structaflor change and sale

Safety

- No major injuries in the past months
- Last nine months Safe Start program recognising fatigue, complacency and state of mind.
- Focus on mobile phone
- Serious reduction in safety incidents with very positive results
- Mental Health training was a focus for this year
- Harassment and bullying training

Environment

- Quiet year
- Complied with regulation
- Completed double skinning of fuel storage tanks to prevent loss of containment
- Boiler work at Christmas
- Market
- Predicted to soften in 2019

Borg Panels
(Including Woodchem and Structaflor)

Tony Truscott is the new facility manager.

Safety

- Opportunity to improve with a couple of major injuries early in the year
- Engaging people in our safety focus and improvement
- Five months in, we have halved injury rate

Environment

- One noise complaint. Investigated and monitored noise levels and found cause to be forklifts
- Building more dams to capture stormwater as a result of the new works
- Formaldehyde spill at Woodchem was contained on site in the bunded areas and resolved. Environmental spill reported as per legal requirements

Community

- Try to be involved in town events e.g. relay for Life; Christmas events etc.
- Christmas shutdown for two weeks
- Construction on site have led to a short term increase in the population of Oberon which has benefited local businesses – number of people starting to reduce
- Oberon Council and Borg joint initiative with concept plan for sports complex out on exhibition for comment

Performance

- Project underway to increase the output from Conti presses
- Targets in departments growing based on record months
- Focus is on quality

Structaflor and New Particle Board Plant

- Minor issues with supplier causing delays
- Log yard still needs work
- Commissioning from January to March

WoodChem

- WorkSafe audit on site with no non conformances

Question asked as to increased traffic between sites
Fran raised issue with chip on roads – Council state that they do clean-ups and will look to charge the companies

General Business

- Increased traffic between sites
- Chip debris on roads – council state that they do clean-ups and will look to charge the companies
- Debris coming off empty log trucks – business to review cleaning methods on site
- Cars speeding on Lowes Mount Road at afternoon shift change – business to notify staff to adhere to legal limits

Next Meeting: 20 March 2019 4pm

Appendix I – Water Quality Exceedance Notifications

Jacqueline Blomberg

From: Jacqueline Blomberg
Sent: Wednesday, 19 December 2018 4:23 PM
To: 'Georgia.Dragicevic@planning.nsw.gov.au'
Cc: Victor Bendevski
Subject: SSD 7016 - water quality

Hi Georgia,

As discussed this afternoon, Borg Panels Oberon had an exceedance of concentration limit for Oil & Grease (O&G) as approved under EPL 3035 for stormwater sampling undertaken on 10 December.

The EPL concentration limit is 10 milligrams per litre, the certificate of analysis result was 19 milligrams per litre as reported on 19 December.

I have reviewed weather data and site inspections (including photos), and discussed site activities with the Environmental Coordinator for on, and around 10 December. I also discussed the results with the laboratory, ALS.

I found there to be no particular site condition or activity that could be associated with this result, that is, no indication that the exceedance resulted from hydrocarbon material. This is supported by the TPH analysis from the same sampling round, <0.010ug/L (<0.1mg/L).

ALC confirmed that O&G analysis included any oil like compounds.

Oil like compounds can be found in pine residue.

As mentioned, another sampling event occurred on 17 December. When that report is provided, I will advise you of the O&G result as a follow up.

Kind Regards

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Jacqueline Blomberg
Environmental Manager

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a:2 Wella Way Somersby NSW 2250

Jacqueline Blomberg

From: Jacqueline Blomberg
Sent: Wednesday, 19 December 2018 4:23 PM
To: 'Andrew Helms'
Cc: Victor Bendevski
Subject: EPL 3035 - water quality

Hi Andrew,

As discussed this afternoon, Borg Panels Oberon had an exceedance of concentration limit for Oil & Grease (O&G) as approved under EPL 3035 for stormwater sampling undertaken on 10 December.

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Kind Regards

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Jacqueline Blomberg

From: Jacqueline Blomberg
Sent: Tuesday, 19 February 2019 4:26 PM
To: 'Andrew Helms'; Georgia Dragicevic
Cc: Victor Bendevski; Sharon Cutting; Tony Truscott
Subject: Water Quality Exceedance
Attachments: BOM rainfall data 190201.docx; Borg Oberon_Daily_Summary_TOTAL Rain Gauge - 190101 - 190201.csv

Good afternoon Andrew and Georgia

This email is to advise you that Borg Panels Oberon had an exceedance of concentration limit for total suspended solids (TSS) and true colour for stormwater sampling event undertaken on 11 February 2019.

Results received from ALS Environmental today reports TSS at 67 milligrams per litre and true colour at 200 PCU. No other exceedances were reported.

Site environmental inspections have been reviewed for the period leading up to 11 February with no site issues identified which could of contributed to these exceedances.

Water quality records for the two preceding weeks were also reviewed with nil exceedances reported.

There were two significant rain events (>10mm) at Oberon prior to the monitoring event. The site weather station recorded the first event on 8 February (18mm) and the second on 9 February (31mm) which may have caused sediment resuspension within the site swales, contributing the these exceedances. I have attached the site weather station data and BOM data for your information. This data also shows a relatively dry period previous to the rain events.

We will of course include this in our Annual Return.

Please do not hesitate to call if you would like to discuss.

Kind Regards

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Environmental Manager

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Jacqueline Blomberg

From: Jacqueline Blomberg
Sent: Thursday, 24 January 2019 4:12 PM
To: 'Andrew Helms'
Cc: 'Georgia.Dragicevic@planning.nsw.gov.au'; Victor Bendevski; Tony Truscott
Subject: Water Quality Exceedance
Attachments: rainfall data BOM - JAN'19.JPG

Hi Andrew

I am writing to advise you that Borg Panels Oberon had an exceedance of concentration limit for total suspended solids (TSS) as set in EPL 3035 for stormwater sampling event undertaken on 14 January 2019.

The EPL concentration limit is 50 milligrams per litre. The certificate of analysis received from ALS today reports 74 milligrams per litre. There were no other exceedances of compounds listed in EPL 3035.

Site environmental inspections reviewed for the period leading up to 14 January did not indicate any site issues that would have contributed to this exceedance. Road surfaces were clear of mud and debris, construction erosion and sediment controls were established and stormwater harvesting was being undertaken.

There was a significant rain event at Oberon on 9 January (40.2mm) and follow up events on 11 and 12 January which could have contributed to the excess sediment load. The attached BOM weather record shows 86mm rainfall during these three events, and also a relatively dry period preceding 9 January which could have also contributed to the excess sediment load.

We will of course include this in our Annual Return.

Please do not hesitate to call if you would like to discuss.

Kind Regards

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Jacqueline Blomberg
Environmental Manager

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Jacqueline Blomberg

From: Jacqueline Blomberg
Sent: Monday, 11 March 2019 3:13 PM
To: EPA RSD Central West Mailbox
Cc: Georgia Dragicevic
Subject: Oberon Water Quality Exceedance

Good afternoon

This email is to advise you that Borg Panels Oberon had an exceedance of concentration limit for Total Phosphorous for stormwater sampling event undertaken on 26 February 2019.

Results received from NATA accredited laboratory ALS Environmental today report Total Phosphorous at 0.41 milligrams per litre. Environment Protection Licence 3035 100 percentile concentration limit for this pollutant is set at 0.3 milligrams per litre.

No other exceedances of pollutants listed in condition L2.5 of EPL 3035 were reported for this sampling event.

This information will be included in the Annual Return.

Kind Regards

Jacqueline Blomberg
Environmental Manager

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a:2 Wella Way Somersby NSW 2250

Jacqueline Blomberg

From: Victor Bendevski
Sent: Tuesday, 24 July 2018 10:09 AM
To: Andrew Helms; Paul Rutherford
Subject: RE: stormwater quality

Hi Andrew and Paul,

A further update on the below.
We have received further result for storm water test (sampled 13/7), it exceeded criteria again. This was for the week before last, however the stormwater detention valve remains shut and we are not discharging stormwater from our site. The only flow leaving the site is the spring dam which is overtopping its weir.
We have pumped out the front swale along Lowes Mount road and tried to remove some vegetative matter which was decomposing. In this area the sediment and water was quite dark and is the likely cause of our exceedances, at the moment we believe it is an accumulation of tannins from Structaflor.

We have also pumped out stormwater dam and continue with the ban on washing activities at the site.
This water is now stored in the large process dam on site, the most Northern on our site.
We have rebuilt our sand filter and will use it to filter the detained water coming from the site once we get some rain again.

A full report will be compiled over the next couple of weeks.
Please call when you are have moment.

Paul, sorry didn't include you in last week's email.

Regards

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Victor Bendevski
Environmental and Regulatory Compliance

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e:bendevskiv@borgs.com.au | w:www.Borgs.com.au
a:2 Wella Way Somersby NSW 2250

From: Victor Bendevski
Sent: Monday, 16 July 2018 1:51 PM
To: Andrew Helms <Andrew.Helms@epa.nsw.gov.au>
Subject: stormwater quality

Hi Andrew,

Not sure if you received my message from last week but we have had some issues with stormwater quality (Pt 1 test results) over the past few weeks.
This has resulted in exceedances against criteria in our license, in particular

BOD, Oil & Grease and MBAS.
As of Friday we also exceeded criteria for Nitrogen and TSS.

We have been scrambling around the site trying to identify potential causes, we are dealing with them as they are uncovered.

- There were some activities of washing vehicles on hard surfaces which we believe has resulted in the high O&G and BOD, we suspect this has accumulated over the dry period (6-9months prior to now) and is getting wash out every time it rains.
- There is organic matter decomposing in the front swale, which has been noted on multiple occasions. This affects the BOD result.
- Dust around the site has been more of an issue of late. Sweepers have been breaking down and there is more activity.

Apart from the above we have not uncovered any other issues.
To reduce and further potential impacts we have also shut our detention valve on the first flush basin to limit discharge and are looking about pumping swale and basin and putting it into a storage dam.

Will keep you updated as matters arise.

Feel free to ring and discuss at your convenience.

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Victor Bendevski
Environmental and Regulatory Compliance

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Appendix J – Incident Notification

Jacqueline Blomberg

From: Victor Bendevski
Sent: Tuesday, 26 February 2019 3:35 PM
To: EPA RSD Central West Mailbox; Georgia Dragicevic
Cc: Jacqueline Blomberg
Subject: Oberon Incident

One the 23rd February 2019 at approximately 8pm there was an incident at the Borg Panels Oberon site. Fire water breached containment and made its way into the stormwater drains and into a portion of the swale surround the transformer yard adjacent to Lowes Mount road. The water did not threaten to escape from site nor did it enter into any larger bodies of water on site.

The incident occurred as a result of the automatic fire monitoring deluge system on the new particle press hot oil pump room being activated, the deluge remained active for about 15-20 minutes before it was acknowledged and turned off by site personnel. The particleboard plant was not operating at the time of the incident. The deluge was activated as a result of a hot oil leak from an Isolating valve which caused smoke, this caused automatic activation of the Suppression system.

A large portion of the firewater was contained within the primary and secondary bunds, however some of the liquid escaped out of an open roller door which then traversed across the concrete hardstand into a culvert drain about 70m away. The water is then piped traveling a further 40-50m at which exits into a swale located at the South Western corner of the on-site transformer yard.

When inspected on Monday 25th the soil in the swale was found to be damp and the decision to remove a 300mm top layer of soil was made, this applied to the immediate area of the pipe exit point.
The SDS for the foam used in the deluge system indicates it is a current generation biodegradable type, however the correct conditions and time are required biodegradation to occur.

Therefore the following actions were enacted:

- All the water collected from various areas of the site was take to the water treatment plant for treatment and reuse. (biological treatment plant)
- The concrete slab which was affected by the runoff was also washed down, with all the water used being collected and sent to the WTP treatment
- The soil that was excavated from the swale will be used as fill on site underneath a concrete slab.

Regards

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Victor Bendevski
Environmental and Regulatory Compliance

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Appendix K – DataStation Incident Logs

ID	Address	Description	Type	Status	Incident Date	Risk Rating	Created By	Additional detail	Investigation Summary
119708	O:PRD - Oberon: Production	ENV: At 1952 the production team leader noticed fire retardant foam and water coming from the hot oil pumping room at Particle board. The foam had run down the concrete and had started to enter the stormwater drain.	Environmental	Closed	23/02/2019 19:52	8	Sharon Cutting	Approx. 50m3 of firewater resulted from the incident. Majority was contained within the primary and secondary bunds in the hot oil room. Some entered the western swale adjacent the transformer yard (approx. 120m from hot oil room) via a culvert drain. Fines were used in conjunction with spill kit items to contain firewater and stop movement to swale. Hardstand areas were washed down. Sucker truck collected approx. 20m3 of firewater from areas where firewater and wash down water had been contained including from the culvert and swale. As a precaution, the top 300mm of impacted soil within the swale was excavated, stockpiled on builders plastic and ERSED controls installed. This spoil will be used on site as fill underneath a concrete slab.	The SDS for the foam used in the system states it is a current generation biodegradable type (i.e. nil PFAS present). No firewater escaped from site or entered into the site stormwater basins. Additional controls to be investigated and if identified, installed. EPA notified. Alarm/activation sensor system adjusted. New system - alarm only where smoke present, activation of deluge system where fire present