B0HP/CEM/23/A

Analysing
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TEST REPORT

Client:
Ormonde Organics
Killowen
Portlaw
Co.Waterford

FAO Pat Cormack

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Test Specification: Noise Monitoring

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Item: ***Noise survey at Noise Sensitive Locations at Ormonde Organics at Killowen, Portlaw, Co.Waterford.***

For and on behalf of BHP Ltd.

Pat O'Sullivan
Date Issued: 03rd November 2010
Supplement to report No. N/A

Contents

Section 1: Baseline Noise Study

1.0 Scope of survey

At the request of Ormonde Organics, BHP undertook noise monitoring at their facility at Killowen, Portlaw, Co. Waterford. The purpose of this survey was to provide Ormonde Organics with the noise data and analysis required for part of their planning and/or permitting/licensing application requirements.

Specifically BHP was instructed to provide the following:

- Conduct an examination of the area and identify the noise sensitive locations.
- Conduct daytime and night-time background monitoring at the representative noise sensitive locations.
- Conduct an assessment of noise output from the proposed development.
- Predict the likely noise levels at the noise sensitive locations.
- Provide an assessment in light of current standards.
- Provide suitable recommendations.

2.0 Survey approach

Cirrus 831A Type 1 sound level meters were used to monitor noise levels. Monitoring and the interpretation of acquired data is to the following standards:

- British Standard: BS 7445 Part 1: 1991 (ISO 1996-1: 1982) Description and measurement of Environmental Noise. Part 1. Guide to quantities and procedures.
- British Standard: BS 7445 Part 2: 1991 (ISO 1996-2: 1987) Description and measurement of Environmental Noise. Part 2. Guide to the acquisition of data pertinent to land use.
- British Standard: BS 7445 Part 3: 1991 (ISO 1996-3: 1987) Description and measurement of Environmental Noise. Part 3. Guide to application to noise limits.

15-minute daytime levels and 15-minute night-time levels were measured at four noise sensitive locations. The 15 minute monitoring times were sufficient for a model considering the nature of the noise at the site (i.e relatively constant). Based on the consistency of the noise, no significant variation would be experienced by extended monitoring spells (e.g. 30 minutes). These locations were labelled N1, N2, N3 and N4 and are identified on the map included in Appendix A.

Appendix B contains photographs of noise monitoring equipment at each monitoring point.

3.0 Date of sampling

BHP Laboratories conducted the noise monitoring on the 14th of October 2010.

4.0 Results

4.1 Noise levels:

Levels are presented on the following pages.

Day-time Measurements - Noise Sensitive Locations – Ormonde Organics (14th October 2010)

Monitoring Locations (N1-N4):

Location	Sampling Interval	Duration (mins)	L_{AEQ} dB	L_{A10} dB	L_{A90} dB	Wind speed m/s	Sampling notes
N1	1316-1331hrs	15	57.4	61.5	41.8	0.1-1.2	The location is close to the front of the operation by the main road. Traffic noise is the main noise source. The plant is barely audible in the background.
N2	1336-1351hrs	15	61.5	68.4	46.5	0.1-1.1	Traffic noise is the main source of noise. The facility was operating up to 40 dB.
N3	1355-1410hrs	15	49.7	56.8	44.0	0.1-1.5	The location is located to the rear of the site. Distant traffic is audible up to 48 dB. Site activity was recorded up to 43 dB.
N4	1414-1429hrs	15	44.3	59.4	41.8	0.1-0.6	Distant traffic is audible up to 46 dB. Birdsong was audible up to 50 dB at times. Otherwise the area was quiet.

Noise Sensitive Location:

The noise sensitive location is defined as the nearest occupied house to the current and proposed facility. This was identified as the Shane O' Connell residence.

Location	Sampling Interval	Duration (mins)	L_{AEQ} dB	L_{A10} dB	L_{A90} dB	Wind speed m/s	Sampling notes
NSL (daytime)	0923-0938	15	48.1	40.6	29.1	0.1-1.0	Traffic noise from R680 is the main noise source. 6 cars passed during monitoring reaching up to 55 dB while 1 lorry passed reaching up to 70 dB. No sound was audible from Ormonde Organics facility.

Location	Sampling Interval	Duration (mins)	L_{AEQ} dB	L_{A10} dB	L_{A90} dB	Wind speed m/s	Sampling notes
NSL (night-time)	0520 - 0535	15	42.8	39.4	27.5	<0.1	The area was quiet during monitoring. No traffic passed and No sound was audible from the Ormonde Organics facility.

4.2 Broadband analysis:

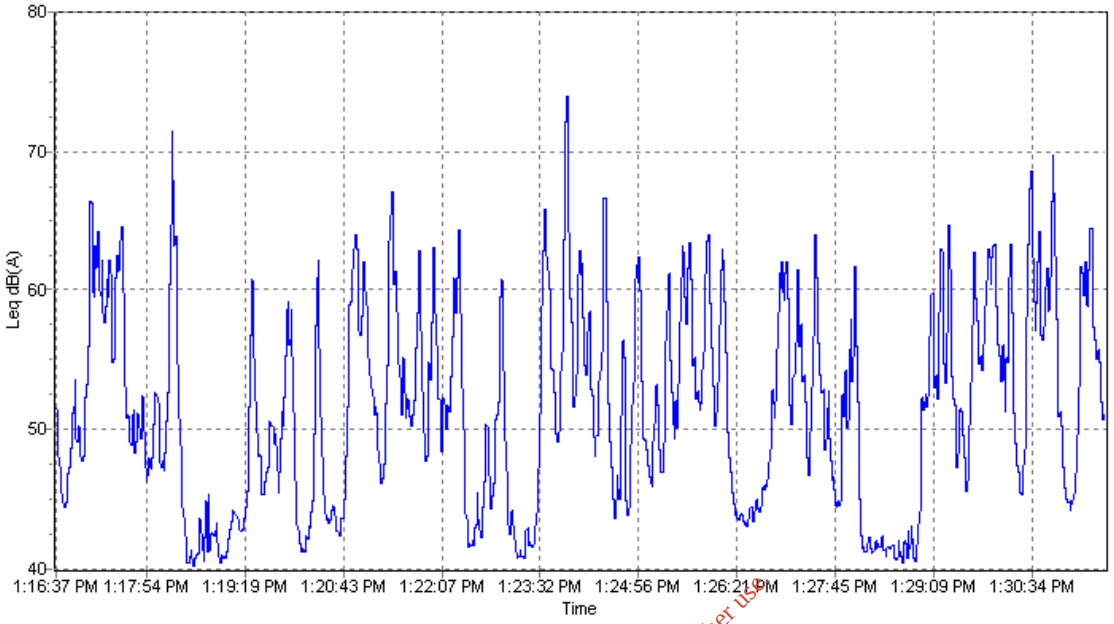


Fig.1: Broadband Analysis at N1 (daytime).

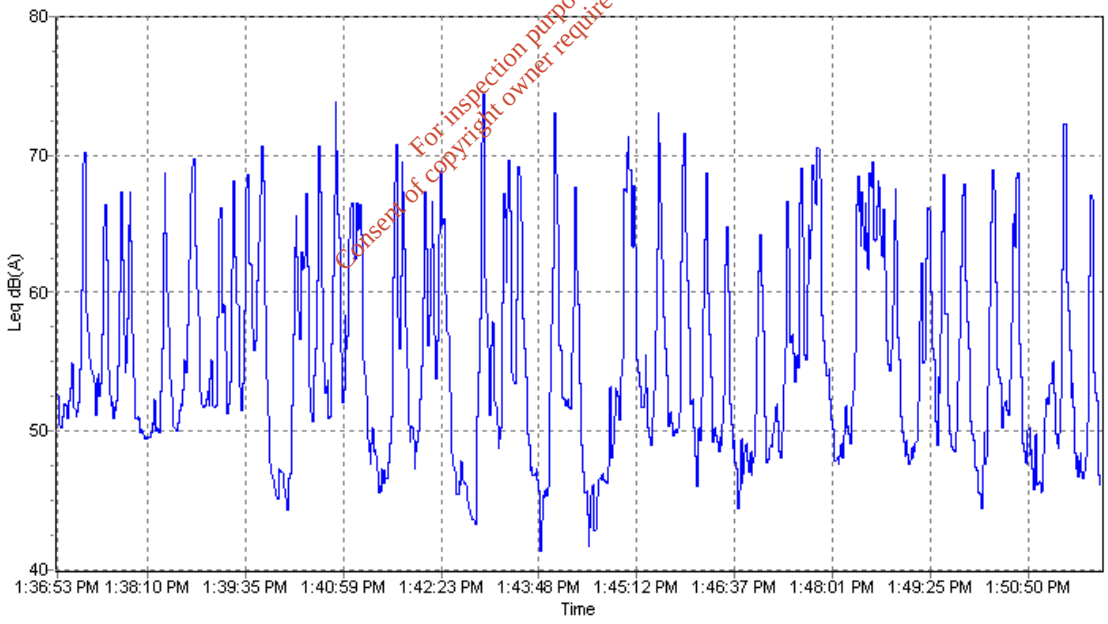


Fig.2: Broadband Analysis at N2 (daytime).

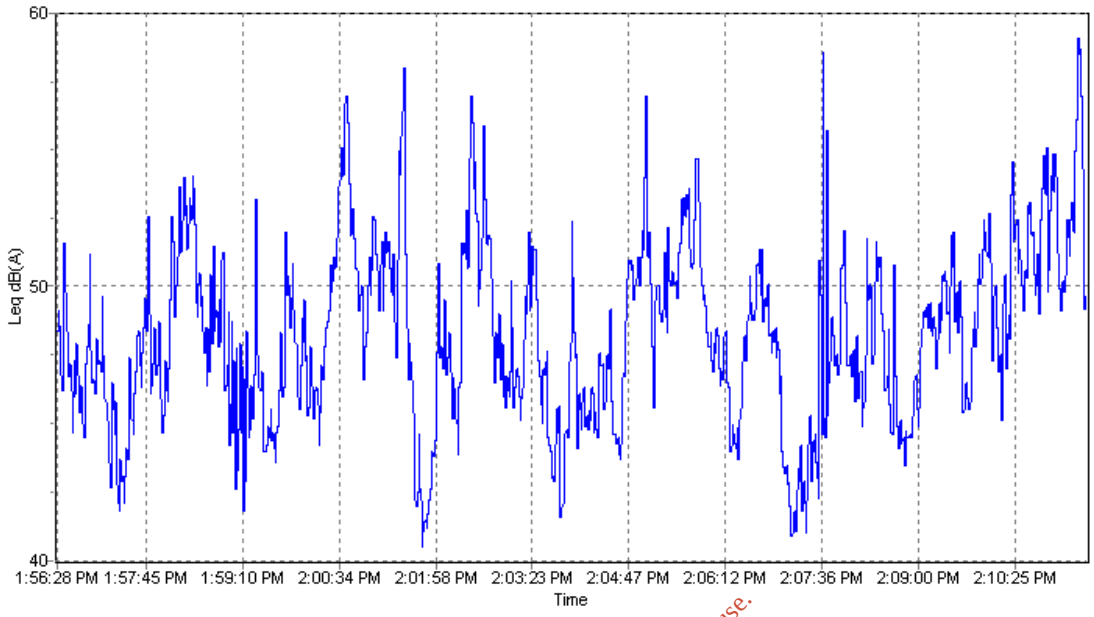


Fig.3: Broadband Analysis at N3 (daytime).

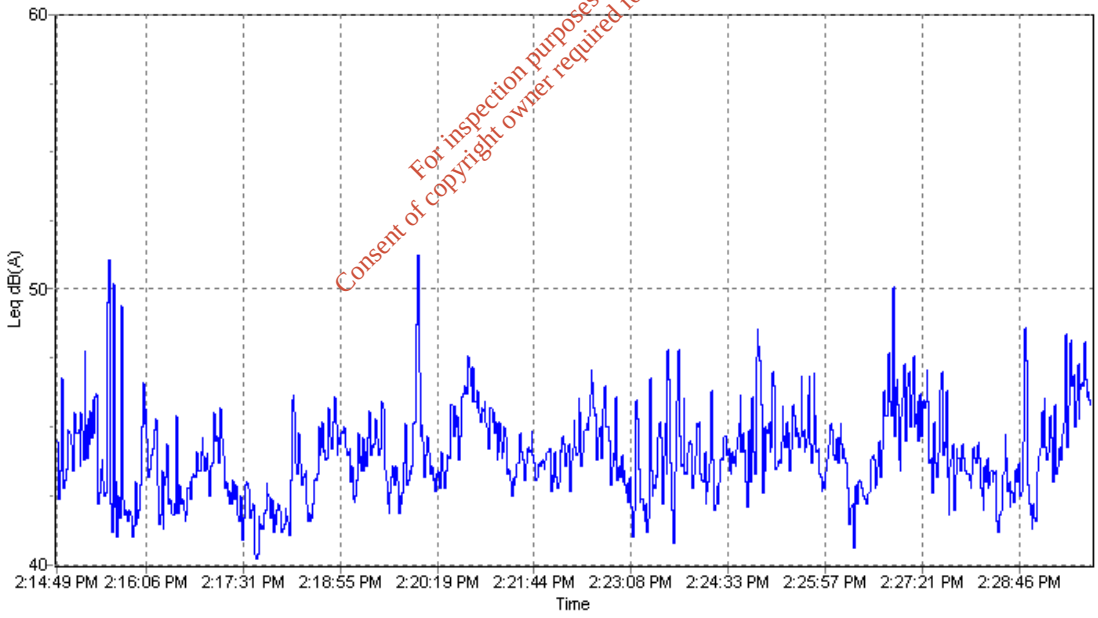


Fig.4: Broadband Analysis at N4 (daytime).

4.3 1/3 Octave Frequency analysis:

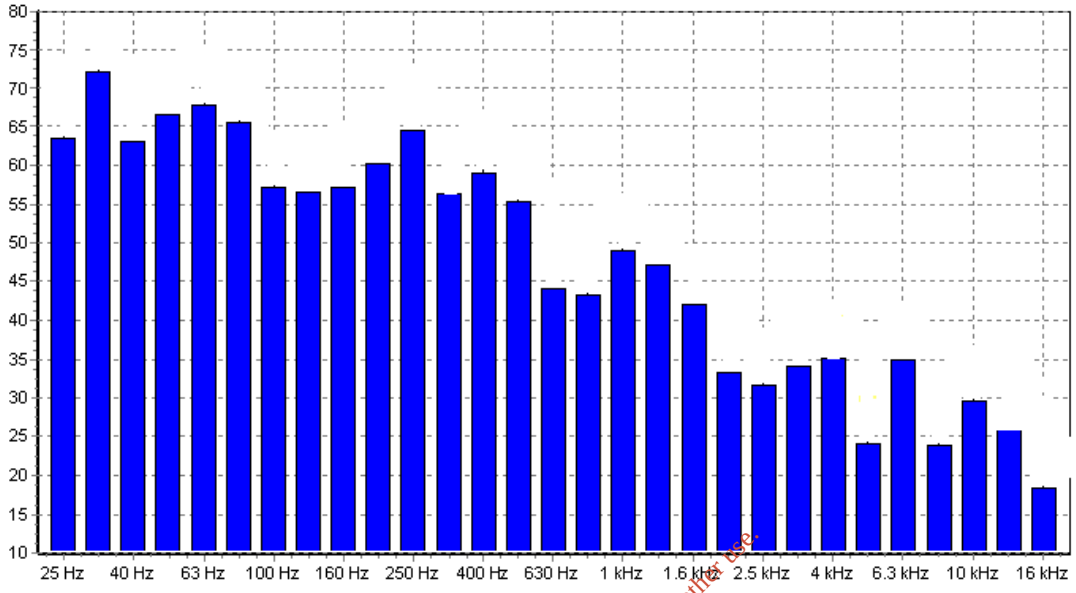


Fig.7: 1/3 Octave Frequency analysis at N1 (daytime)

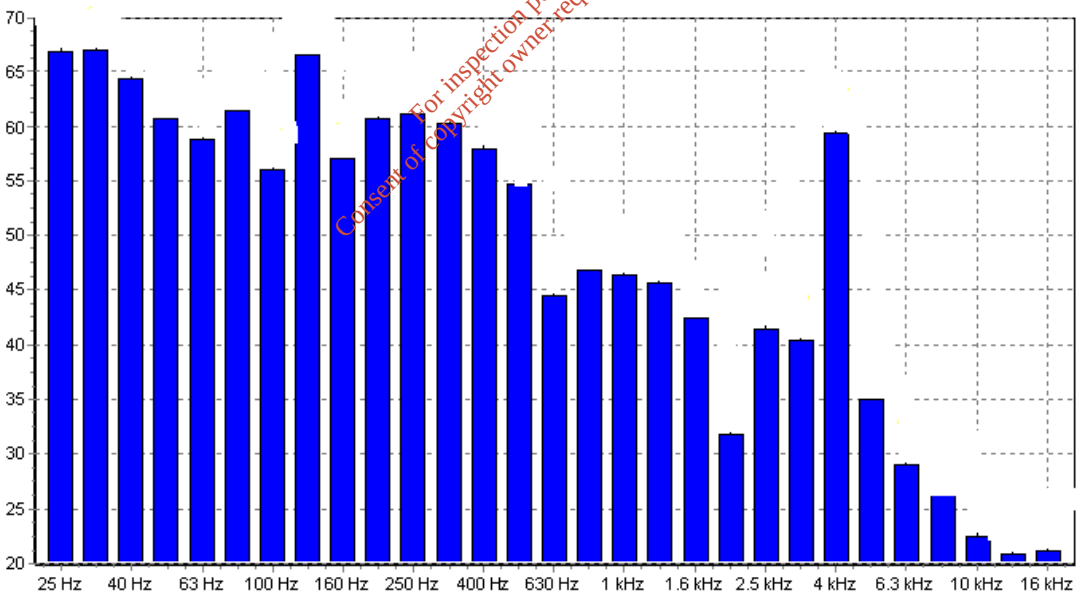


Fig.8: 1/3 Octave Frequency analysis at N2 (daytime)

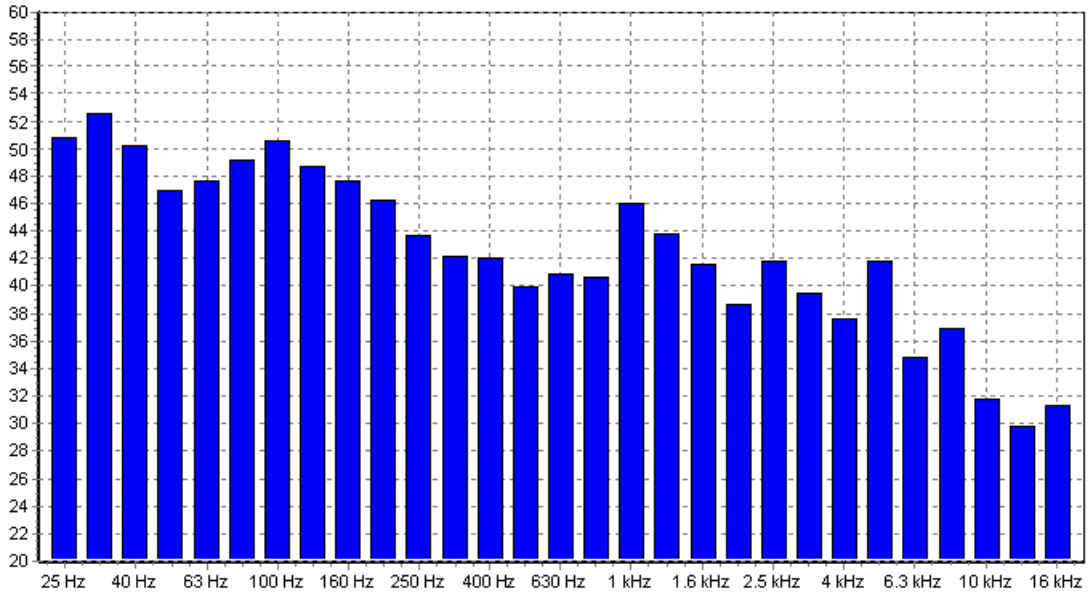


Fig.9: 1/3 Octave Frequency analysis at N3 (daytime)

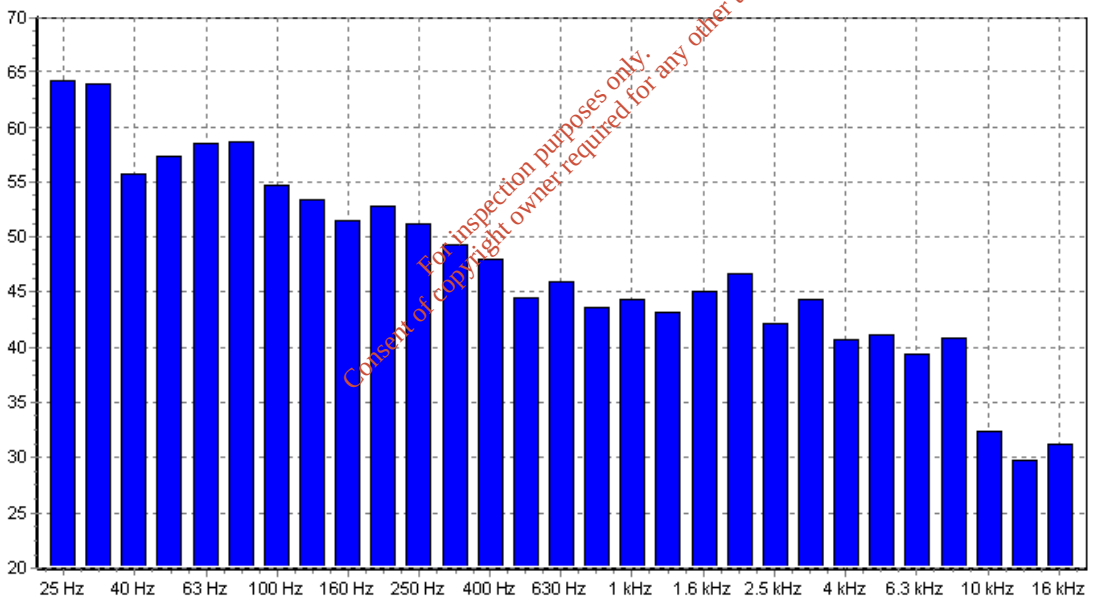


Fig.10: 1/3 Octave Frequency analysis at N4 (daytime)

5.0 Interpretation of results

5.1 Noise levels;

The Environmental Protection Agency (EPA) has produced a Guidance Note for Noise in Relation to Scheduled Activities (EPA, 1996). It deals in general terms with the approach to be taken in the measurement and control of noise, and provides advice in relation to the setting of noise emission limit values and compliance monitoring. It is recommended that noise from the activities on site shall not exceed the following noise emission limit values at the nearest noise sensitive receptor:

Daytime Limit (08:00-20:00 hrs) $L_{Aeq} < 55dB$

Night time Limit (20:00- 08:00 hrs) $L_{Aeq} < 45dB$

5.1.1 Day-time levels:

As can be seen in section 4.1, L_{Aeq} levels at N1 and N2 for this most recent survey are greater than the day time limit of 55dB. The location is very close to the main road and the noise is reflective of this rather than activities at Ormonde Organics. There was no evidence of a tonal or impulsive component to the recorded noise.

5.1.2 Night-time levels :

Night-time monitoring was conducted as part of this survey. No traffic passed during night time monitoring. The noise level recorded (42.8 dB L_{Aeq}) was less than the night time limit of 45 dB L_{Aeq}.

5.1.3 Noise Sensitive Location :

Noise monitoring was conducted at one Noise Sensitive Location (NSL). Activities from Ormonde Organics were not audible at the NSL. The noise level at this residence (NSL) is strongly influenced by road traffic on the R680. The noise levels from passing cars were 55 dB and from trucks was 70 dB.

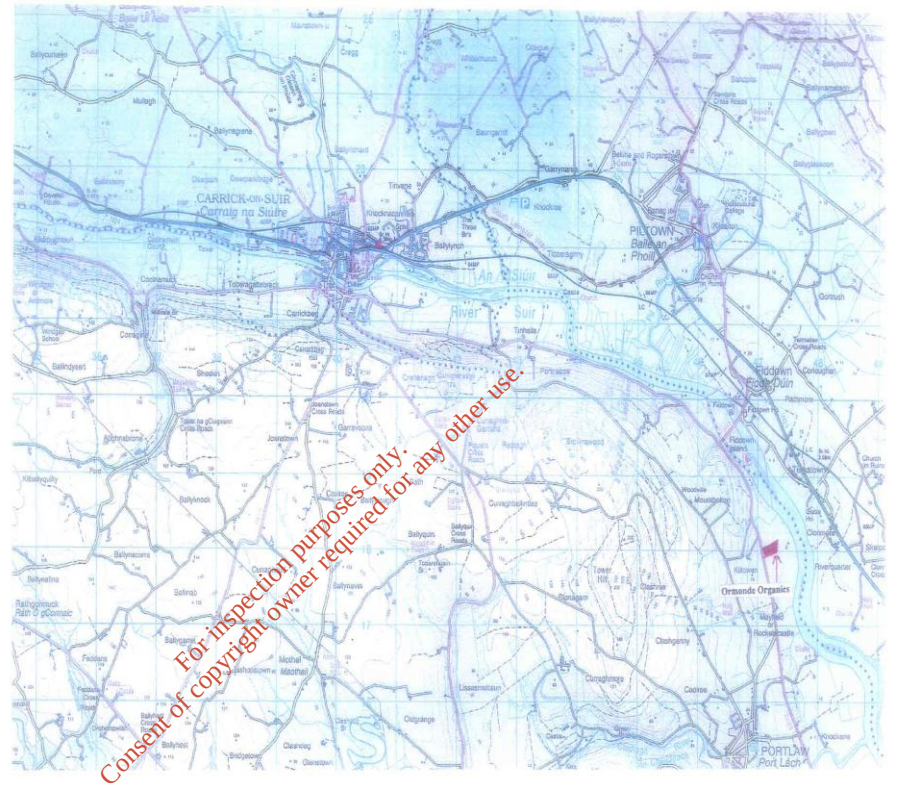
6.0 Conclusions

The noise contribution made by Ormonde Organics does not exceed the daytime limit of 55dB at the noise monitoring locations. The noise levels encountered at N1 and N2 are reflective of passing traffic.

Appendix A

Site map showing noise sensitive locations (N1 to N4)

Site map showing location of Ormonde Organics



Appendix B

Photographs of Noise monitoring equipment on-site

Noise monitoring equipment at N 1

Noise monitoring equipment at N2

Noise monitoring equipment at N3

Noise monitoring equipment at N4

Section 2: Assessment of Predicted Noise Levels

1.0 Introduction

At the request of Ormonde Organics, BHP conducted a noise-monitoring programme at the operation at Killowen, Portlaw, Co.Waterford.

This section provides an assessment of predicted noise emissions during the course of operations of the development, having regard to the time frame of operations and scale of activity at the site. This section deals with the following:
a) An examination of the impact of noise emissions on the surrounding environment of the proposed facility when operational, especially on the residential unit closest to the site.
b) Proposed measures to be employed to mitigate against noise emissions.

All responses made here have due consideration to the worst-case scenario being predicted. To that end the FHA Noise Model (Version 2.1) has been used to model the predictive noise.

Environmental noise modelling describes the process of theoretically estimating noise levels within a region of interest under a specific set of conditions.

The specific set of conditions for which the noise is being estimated will be a fixed representation or 'snapshot' of a physical environment of interest. However, in practice the physical environment will usually not be fixed, but will be characterised by constantly varying conditions. These variations in real world conditions will subsequently cause the actual sound field to vary in time and space. Thus it is important to recognise that the output of an environmental noise model will only represent an estimate for a 'snapshot' of the range of actual environmental noise levels that could occur in time and space.

Recognising that modelling is a means of estimating noise for a specific set of conditions, attention is now directed to defining what these conditions are. The key conditions that a noise model relates to are:

- An approximation of the noise source, or sources, for which associated environmental noise levels are of interest.
- An approximation of the physical environment through which noise will transmit from the noise source(s) to the location or region of interest. This includes the ground terrain, the built environment, and atmospheric conditions (e.g. wind, temperature, humidity)
- An approximation of the way in which sound will travel from the input noise source(s) via the input physical environment, to the receiver location or region of interest

Thus, producing an environmental noise model involves defining a series of noise sources to be investigated, describing acoustically significant features of the environment through which sound will propagate to the receiver, and then applying a calculation method that accounts for these descriptions to produce an estimated noise level at a location or region of interest.

To that end the FHA Noise model was chosen as it allows for multiple inputs, takes account of the terrain and uses a spherical progagation methodology. The model also allows for the prediction of noise levels on the receiver at selected distances with and without barriers of various heights.

These predicted noise levels were made using the following data:

- Noise monitoring data collected that forms the basis of Part A of this report.
- Occupational Noise data supplied by Ormonde Organics relating to machinery activity on site.

The current occupational noise levels for the machinery on site are as follows:

Noise Source	Ppeak dB (A)
Caterpillar Loader IT62H	106
Caterpillar Loader IT14G	102
JCB Loader 456 EHT	109
JCB loader 436 EHT	105
Incoming Trucks	80

The additional proposed development sees the addition of a primary tank, after digester tank and associated processing equipment (Combined Heat & Power Unit). The principal noise emitting components of the proposed Anaerobic Digestion unit include:

- Propellers/Mixers inside the digesters – these generate maximum noise levels of 74 dB. The Digester tanks will be fully covered.

- The maximum noise levels of the CHP unit is projected as 90 dB. The CHP unit will be completely enclosed with insulated walls, thereby significantly reducing the noise levels.

- Other equipment including Coulisse Dampers, CHP Stack and Cooler Table.

The site is well screened and shown overleaf is a map of the proposed site including additional infrastructure.

2.0 Impact on the surrounding environment (operational phase)

The proposed development when operational will involve an associated increase in vehicular traffic into and out of the plant.

The worst-case scenario will involve activities close to the proposed development in and around N4 and at the entrance to the facility in and around N1.

The table illustrates the resulting level of noise emissions for what the worst-case scenario for the noise sensitive location for a frequency of 5 extra truck movements in an hour between 8am and 6pm with and without a 2 meter earth barrier.

Scenario: 10m from N1 with oncoming wind (2-5 m/s)-No barrier

Monitoring Location	**$L_{AEQ\ (30mins)}$ dB**
N1	63.2

Scenario: 10m from N1 with oncoming wind (2-5 m/s)-With barrier

Monitoring Location	**$L_{AEQ\ (30mins)}$ dB**
N1	55.8

Scenario: 10m from N4 with oncoming wind (2-5 m/s)-No barrier

Monitoring Location	**$L_{AEQ\ (30mins)}$ dB**
N4	54.3

Scenario: 10m from N4 with oncoming wind (2-5 m/s)-With barrier

Monitoring Location	**$L_{AEQ\ (30mins)}$ dB**
N4	45.6

3.0 Proposed Noise Mitigation Measures

BHP Laboratories present here a noise reduction and management plan for the operational lifetime of the proposed facility.

A noise management plan is an essential part of controlling noise emissions during the operational lifetime of the proposed facility. Elements of this plan may be incorporated into any future environmental management system of the proposed facility.

Noise Emission Control Measures

Ormonde Organics and their suppliers are ensuring that all equipment installed in the proposed new facility is designed to the latest international best practice for mitigation of noise. Features of this equipment are the control and management of noise emissions.

The main potential sources of emissions from the facility are from vehicles entering and exiting the site and reversing sirens.

The table below illustrates the main transfer points and technology used to reduce any noise emissions.

Source	Control
Vehicles moving around site.	Maintained Internal Haul Roads
Reversing Sirens	Speed Limit of 30 km/hr and substitution with white noise technology
Operational Noise	Ensure all roller doors are closed.

Presented here is a site noise control checklist for incorporation into the environmental management system for the proposed facility. It may also be used standalone as a tool for managing any noise emissions. It encompasses all aspects of operational site noise control under the following headings:

- Operational Site Measures
- Hauled Materials
- Paved Road Access/Egress
- Monitoring

Site Noise Emission Control Checklist

Ormonde Organics			
Operational Site Measures	Yes	No	Comments
Areas to be protected are fenced or blocked off			
Physical Noise Barriers are correctly placed and maintained			
Site Traffic is controlled and entry/exit points correct			
Vegetation retention and revegetation measures are being carried out as required			
Hauled Materials			
Loads are kept within designated load limits			
Loads are secure and trucks are secure before moving off.			
Paved Road Access/Egress			
Site access/exit is stabilised through a concrete or equivalent surface			
Monitoring			
A noise monitoring programme is in place			
This information is true and correct to the best of my knowledge			
Name of the person inspecting the site			
Signature			
Date of Site Inspection			

Projected Noise Monitoring locations

To ensure compliance with current noise guidelines or future imposed guidelines (which may be lower), BHP propose that Ormonde Organics develop a suitable environmental noise emission monitoring programme at least 4 locations, all of which represent noise sensitive locations within 400m from the centre of the proposed site.

Conclusions and Recommendations of the Study

1: Using baseline and data gathered from the active site it is concluded that noise levels resulting **from** the proposed development will not exceed 55dB (L_{AEQ}) at the current noise monitoring locations. This is the level as recommended by the EPA for such activities. This is separate to the recorded noise levels due to passing traffic on the road.

2: Noise levels are projected to marginally increase due to increased traffic movements close to location N4. The projected increase in noise levels in comparison to what is already present will not represent a nuisance.

Recommendations

The following points are recommended with a view to reducing overall noise impacts on the noise sensitive locations.

1: The internal access roads should be maintained to reduce vehicular noise, especially banging from empty trucks.

2: A speed limit of 30 km/hr should apply for vehicles operating in the site.

3: Any external noise producing activities or other mobile external processes should occur in well-screened parts of the operation to further reduce noise impacts.

4: Activity should be limited to between 0700 hrs and 2000 hours Monday to Friday. BHP are aware that some isolated traffic movements may occur during night time hours but that most activity will be limited to internal plant operations.

5: Periodic noise monitoring at the noise sensitive locations should be introduced to ensure that all national guidelines in relation to noise ELV's are being complied with.

6: A review of reversing sirens should take place with a view to their possible replacement with white sound technology.

References

1: Environmental Quality Objectives (Noise in Quiet Areas) Synthesis Report, EPA, 2000.

2: Environmental Protection Agency NSW, 2002. Draft Noise Guide for Local Government.

3: EU, 2002. Directive 2002/49/EC of the European Parliament and of the Council of June 25 2002 relating to the assessment and management of environmental noise. Official Journal of the European Communities, L189/12-25, 18.7.20

4: ISO 9613, 1996(E). Attenuation of Sound during Propagation Outdoors. Part 1. Calculation of the Absorption of Sound by the Atmosphere. Part 2. General Method of Calculation.

5:Environment Agency UK, 2001. Technical Guidance Note IPPC H3. Draft Horizontal Guidance for Noise Part 2, Noise Assessment and Control.

6: Environmental Management Guidelines: Environmenta; Management in the Extractive Industry (non-scheduled minerals), EPA, 2006.

7: Guide to Predictive Modelling for Environmental Noise assessment published by the National Physics Laboratory, UK, 2009.