

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**BANAGHER CHILLING LIMITED, BANAGHER, CO. OFFALY**

## **6.0 NOISE & VIBRATION**

### **6.1 INTRODUCTION**

A Noise and Vibration Impact Assessment report has been prepared by Enfonic Ltd, included as Attachment 6.1, to accompany this EIAR for Banagher Chilling Limited.

The study identifies, describes and assesses the impact of the proposed development in terms of noise, in particular, the potential noise impacts on residential locations (sensitive receptors) in the vicinity of the proposed development.

This section of the EIAR is a summary of the findings of the Noise Assessment Report by PES Ltd.

### **6.2 APPLICABLE GUIDANCE**

#### **BS:4142**

Suitable guidance on environmental noise for planning purposes can be found in the standard BS 4142:2014 Methods for rating and assessing industrial and commercial sound.

This standard describes a method for assessing the impact of a proposed or existing industrial or commercial sound source. Its principal uses are to assess noise from new or changed industrial or commercial premises, to accompany a planning application, or to assess noise which may be giving rise to complaints.

The standard is basic in principle, but the details can be complex. In the simplest terms, the procedure rates the noise levels from an operation (the 'Specific' noise) and compares it with the 'Background' noise levels in the absence of the noise source(s) under investigation. The level difference is an indication of the impact that the operation might have.

If for example, if the 'Rated' noise level (the Specific noise + any penalties for particular noise characteristics) exceeds the Background noise by 10dB or more, it is likely to be an indication of a significant adverse impact. A difference of around 5dB indicates an adverse impact. If the level does not exceed the background, it is likely to have a low impact.

This however is dependent on the 'context' of the site and its environs e.g. time of day, nature of the neighbourhood, local attitudes to the development etc. There is also a degree of uncertainty applicable to the results e.g. for weather, instrumentation, measurement duration, calculation errors etc. which ought to be considered.

#### **ISO:1996**

This standard defines the basic quantities to be used for the description of noise in community environments and describes basic assessment procedures. It also specifies methods to assess environmental noise and gives guidance on predicting the potential annoyance response of a community to long-term exposure from various types of environmental noises.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**BANAGHER CHILLING LIMITED, BANAGHER, CO. OFFALY**

For example, it stipulates that noise measurements taken when it's raining are invalid†. It also advises on microphone positioning and other relevant procedures such as recording weather conditions.

**ISO9613**

Acoustics -- Attenuation of sound during propagation outdoors is used to predict the noise level from sources within the development.

**CRTN**

U.K. Department of Transport (Welsh Office) Document 'Calculation of Road Traffic Noise' (CRTN) 1988 is used for the prediction of road traffic noise following guidelines issued by Transport Infrastructure Ireland (TII)

**BS5228**

The impact of noise and vibration from construction activities can be assessed using this Code of practice for noise and vibration control on construction and open sites.

The guidance adopted in this standard designates noise sensitive locations into a specific category, based on the existing ambient noise levels i.e. in the absence of construction noise. This then sets threshold noise values for construction related noise that if exceeded, indicates a significant noise impact is associated with the construction activities.

### **6.3 ASSESSMENT CRITERIA & METHODOLOGY**

In order to assess the noise impact of any proposed development, the following methodology is adopted.

#### **6.3.1 BASELINE**

The first stage is to assess and quantify the existing noise environment close to nearby sensitive receptors that may be affected by the proposed development.

Attended noise measurements were taken during the day at four locations close to the site of the proposed development. Being representative of the closest residential dwellings. A series of three non-consecutive 15min noise measurements were taken in calm, dry conditions on Mar 8, 2019 using a B&K Type 2250 Sound Level Meter which was calibrated before and checked after the survey.

**Table 6.1: Baseline Noise Monitoring Locations**

LOCATION	DESCRIPTION
1	At the entrance to a dwelling off the R438 SW of the proposed development
2	Outside a nursing home on the L7016 W of the proposed development
3	Adjacent to the entrance to the proposed development on the L7016
4	SE of the proposed development on the L7016



**Figure 6.1:** Attended Noise Survey Locations (green microphone symbols). Other model elements include: buildings (purple features) and noise sources (red asterisks).

### 6.3.2 OPERATIONAL PHASE

Operational noise levels are predicted, and the impact at the sensitive receptors assessed.

Operational sources considered are;

- External noise sources associated with the operational of the development. These are primarily items of plant e.g. compressors, pumps etc. and idling trailer and the Lairage Area.
- Road Traffic including changes to traffic flows on the existing road network as a result of the development.

### 6.3.3 CONSTRUCTION PHASE

The results of the baseline noise assessment are used for the initial impact assessment of construction noise and vibration. Details of the construction plant and processed to be used is not yet finalised, but typical best practice is discussed and recommendations to be included in the final plan offered.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**BANAGHER CHILLING LIMITED, BANAGHER, CO. OFFALY**

## 6.4 EXISTING NOISE CLIMATE

The results of the noise measurement are presented in Table 6.2 below.

**Table 6.2:** Baseline Noise Measurements at Closest Residential Dwellings

Day-time		dB (re. $2 \times 10^{-5}$ Pa)			
Survey Location	Start Time	L <sub>Aeq</sub>	L <sub>AF10.0</sub>	L <sub>AF90.0</sub>	Main Noise Sources (ranked in significance)
1a	08/03/2019 11:15	69.9	61.7	41.0	Local Road Traffic Noise (RTN) from R438, Bird Song, Farm activity to east, HGV X4, Distant RTN
1b	08/03/2019 12:24	72.9	70.8	45.8	Local RTN from R438, Bird Song, Farm activity to east, Farm machinery, HGV X6, Distant RTN
1c	08/03/2019 13:34	71.2	66.9	44.0	Local RTN from R438, Bird Song, Farm activity to east, HGV X5, Distant RTN
	<b>Average:</b>	<b>71.3</b>	<b>66.5</b>	<b>43.6</b>	
2a	08/03/2019 11:32	63.1	58.2	42.6	Bird Song, occasional local RTN, occasional HGV, RTN from R438
2b	08/03/2019 12:42	57.2	55.9	39.9	Bird Song, Local RTN, HGV
Survey Location	Start Time	L <sub>Aeq</sub>	L <sub>AF10.0</sub>	L <sub>AF90.0</sub>	Main Noise Sources (ranked in significance)
2c	08/03/2019 13:51	55.7	56.5	45.4	Bird Song, Local RTN, HGV
	<b>Average:</b>	<b>58.6</b>	<b>56.9</b>	<b>42.6</b>	
	08/03/2019 11:49	56.9	51.3	39.2	Bird Song, occasional local RTN, Farm machinery noise to south, Wind Turbine
3a	08/03/2019 12:58	56.7	49.4	37.9	Bird Song, Wind Turbines, occasional local RTN
3b	08/03/2019 14:09	57.2	56.9	42.8	Bird Song, Wind Turbines, occasional local RTN
3c	<b>Average:</b>	<b>56.9</b>	<b>52.5</b>	<b>39.9</b>	
4a	08/03/2019 12:07	57.4	47.5	41.0	Bird Song, Wind Turbines, occasional local RTN
4b	08/03/2019 13:17	54.3	50.2	41.5	Bird Song, Wind Turbines, occasional local RTN
4c	08/03/2019 14:28	60.2	59.6	44.7	Bird Song, Wind Turbines, occasional local RTN
	<b>Average:</b>	<b>57.3</b>	<b>52.4</b>	<b>42.4</b>	

# ENVIRONMENTAL IMPACT ASSESSMENT REPORT

## BANAGHER CHILLING LIMITED, BANAGHER, CO. OFFALY

The Mean Value of the LAeq parameter is considered representative of the Ambient noise level under the measurement conditions.

The Mean Value of the LAF90 parameter is considered representative of the Background noise level under the measurement conditions.

The Mean Value of the LAF10 parameter is considered representative of the Traffic noise level under the measurement conditions.

An evening-time or night-time survey was not required as significant operational activities will not occur outside of 07:00-19:00hrs.

### 6.5 IMPACT ASSESSMENT

#### 6.5.1 LEGISLATIVE CONTEXT

There is no statutory Irish guidance relating to the maximum permissible noise level that may be generated by such a development. Local authorities may control operations by imposing limits on the hours of operation and/or may consider noise limits at their discretion. In the absence of specific noise limits, appropriate criteria relating to permissible operational noise levels for a development of this scale may be found in the following guidance:

- **Environmental Protection Agency (EPA) – Noise Guidance (NG4)**

This guidance is only applicable to industrial operations which fall within the remit of the EPA and so cannot be directly applied to this development.

However, typical limits set would likely be 55dBA for day-time operations and 45dBA for night-time which may, nonetheless be useful in this context.

- **World Health Organisation (WHO) - Environmental Noise Guideline**

This sets health-based recommendations on average environmental noise exposure of five relevant sources of environmental noise.

There are no prescribed limits set but rather a comparative assessment is recommended, based on noise levels of the existing receiving environment. This approach is also followed in the BS4142 methodology used in this assessment.

The WHO guidelines use established concepts from toxicology as follows:

***NOEL – No Observed Effect Level***

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

***LOAEL – Lowest Observed Adverse Effect Level***

This is the level above which adverse effects on health and quality of life can be detected.



**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**BANAGHER CHILLING LIMITED, BANAGHER, CO. OFFALY**

***SOAEL – Significant Observed Adverse Effect Level***

This is the level above which significant adverse effects on health and quality of life occur.

***UOAEL – Unacceptable Observed Adverse Effect Level***

This is the level above which unacceptable adverse effects on health and quality of life occur.

Table 6.3 presents a hierarchy of these terms, related examples, impact in terms of noise levels and recommended actions.

**Table 6.3:** Noise Exposure Hierarchy (based on WHO Guidance)

Perception	Examples of Outcomes	Noise Level Criteria	Action
<b>No Observed Effect Level (NOEL):</b>			
Not noticeable	No Effect	Noise Rating Level ( $L_{Aeq,T}$ ) is below background noise level ( $L_{A90,T}$ )	No specific measures required
<b>Lowest Observed Adverse Effect Level (LOAEL):</b>			
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life	Noise Rating Level ( $L_{Aeq,T}$ ) between 0-5 dB above the background noise level ( $L_{A90,T}$ ). LOAEL is equivalent to background noise level	No specific measures required
<b>Significant Observed Adverse Effect Level (SOAEL):</b>			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area	Noise Rating Level ( $L_{Aeq,T}$ ) 10 dB or greater above the background noise level ( $L_{A90,T}$ ).	Avoid
<b>Unacceptable Observed Adverse Effect Level (UOAEL):</b>			
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and nonauditory	Noise Rating Level ( $L_{Aeq,T}$ ) 15 dB or greater above the background noise level ( $L_{A90,T}$ ).	Prevent

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**BANAGHER CHILLING LIMITED, BANAGHER, CO. OFFALY**

### **6.5.2 IMPACT ASSESSMENT RESULTS - OPERATIONAL**

Following the guidelines of BS4142, the ‘Specific’ noise at sensitive receptor as a result of the operations of the proposed development must first be calculated. Proprietary noise calculation software was used for the purposes of this impact assessment, Brüel & Kjær Type 7810 Predictor.

It has been assumed that for the purposes of the noise model that all sources are operational simultaneously. While this might not be the case for the true operation of the site, it represents a ‘worse-case’ in terms of the impact assessment.

Following the procedures of BS4142:2014, penalties/adjustments to the predicted ‘Specific’ noise levels may be applied. These include penalties for Tonal and Impulsive characteristics of the site noise and its intermittency. The noise is not expected to exhibit any of these characteristics, so no penalties have been applied.

Uncertainty in the predicted noise levels is a factor that ought also to be considered. The penalties and uncertainties are added to the predicted noise level to give the Rating Level, L<sub>r</sub>.

**Table 6.4:** Impact Results for Operational Sources

<b>Description</b>	<b>Specific Noise</b>	<b>Penalties</b>	<b>Uncertainty</b>	<b>Rated Level (L<sub>r</sub>)</b>	<b>Background L<sub>AF90</sub></b>	<b>Impact Level Difference</b>
<b>Survey Location 1</b>	22.8	0	3	26	44	-18
<b>Survey Location 2</b>	29.8	0	3	33	43	-10
<b>Survey Location 3</b>	35.4	0	3	38	40	-2
<b>Survey Location 4</b>	32.9	0	3	36	42	-6

As can be seen from the results, the predicted noise levels are likely to be below the existing background levels at all Survey Locations. These would therefore fall into the No Observed Effect Level (NOEL) criteria and no specific measures (of noise control) need apply.

Therefore, no adverse impact identified by BS4142 at any location due to the operational noise sources is likely.

The predicted noise levels are also well below a typical limit of 55dBA that may apply were this an EPA scheduled activity.

### **6.5.3 IMPACT ASSESSMENT RESULTS - TRAFFIC**

A noise model was developed for the associated increase in traffic from the proposed development. The applicable guidance as recommended by Transport Infrastructure Ireland (TII) is the CRTN standard. This uses traffic flow data including quantity of vehicles, velocity and percentage of heavy goods vehicles (HGVs).

Figures for Annual Average Daily Traffic (AADT) for two scenarios were provided by Panther Environmental from a traffic impact assessment completed in support of this EIAR.

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**BANAGHER CHILLING LIMITED, BANAGHER, CO. OFFALY**

Traffic is predicted to increase in the area regardless of whether the proposed development proceeds.

As all other inputs are fixed e.g. traffic speed, road surface type etc., the result differences are attributable solely the change in traffic volume and mix of HGVs. The difference in the results is therefore the important consideration rather than the respective predicated levels

**Table 6.5:** Predicted Day-time Noise Levels from the Proposed Development.

LOCATION	DO NOTHING	DO SOMETHING	DIFFERENCE
Survey Location 1	65.7	66.3	0.6
Survey Location 2	55.6	65.6	10.0
Survey Location 3	44.5	51.6	7.1
Survey Location 4	36.6	38.1	1.5

In terms of traffic noise impact; Location 2, which is outside the nursing home close to the junction of all roads in this assessment, exhibits a large increase in noise of 10dB.

The Survey Location 2 is set beside the L7016 road with the building approximately 50m back. To better represent the impact at this building, the noise level outside the Nursing home has also been predicted.

The predicted level at this location was 58.8dBA, some 6.8dB less than for the position of Survey Location 2. The measured background level from Survey Location 2 is likely to be similar at the Nursing home, therefore the impact is 3.2dB.

This impact falls with the **Lowest Observed Adverse Effect Level (LOAEL)** criteria and no specific measures (of noise control) need apply.

In addition, it is understood that the design of the Nursing home is such that only offices face the roads and a quiet courtyard exists within the building envelope.

#### **6.5.4 IMPACT ASSESSMENT RESULTS - CONSTRUCTION**

The guidance adopted in the BS5228 standard designates noise sensitive locations into a specific category; A, B or C, based on existing ambient noise levels i.e. in the absence of construction noise. This then sets threshold noise values for construction related noise that if exceeded, indicates a significant noise impact is associated with the construction activities.

Construction for the proposed development will only take place from 07:00 – 19:00 Mon-Fri, 08:00 to 14:00 Sat. The  $L_{Aeq}$  Ambient noise levels at the Survey Locations are presented in Table 6.2 and following the guidelines, the resultant limits are shown in Table 6.6.



**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**BANAGHER CHILLING LIMITED, BANAGHER, CO. OFFALY**

**Table 6.6: Applicable Construction Noise Limits**

Survey Location	Ambient Noise Level	Rounded to nearest 5dB	Applicable Category (Day-time)	Applicable $L_{Aeq}$ Limit
1	71.3	70	B	70
2	58.6	60	A	65
3	56.1	60	A	65
4	57.3	60	A	65

#### 6.5.5 IMPACT ASSESSMENT RESULTS - VIBRATION

There are no habitable dwellings close to the proposed development and the expected vibration levels from the construction site are expected to be undetectable at the closest sensitive receptors.

#### 6.6 MITIGATION MEASURES

No impacts are predicted as a result of the operational phase of the proposed development and no specific measures (of noise control) need apply.

Operations carried out during the construction phase would be required to comply with the recommended noise limits detailed in Table 6.6 above.

Based on information in the Construction Details document provided and given the likely requirements of a site of this scale, it is considered that there is little likelihood of a significant adverse impact from the construction works. Nonetheless, a comprehensive Construction Environmental Management Plan which includes adopting appropriate mitigation measures will manage the risk of noise impacting the community.

The following is a broad outline of recommended actions to include in the plan.

- No plant used on site will be permitted to cause an ongoing public nuisance due to noise;
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations;
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract;
- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;
- Any plant, such as generators or pumps, which is required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen;

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**BANAGHER CHILLING LIMITED, BANAGHER, CO. OFFALY**

- Location of plant shall consider the likely noise propagation to nearby sensitive receptors;
- During the course of the construction programme, supervision of the works will include ensuring compliance with the limits detailed in Table 2 using methods outlined in BS5228:2009 Part 1.

**Working Hours**

Normal working times will be 07:00 to 19:00hrs Monday to Friday, 08:00 to 14:00 Saturdays. Works other than the pumping out of excavations, security and emergency works will not be undertaken outside these working hours without the written permission of the Contracting Authority.

Works other than the pumping out of excavations, security and emergency works will not be undertaken at night and on Sundays without the written permission of the Contracting Authority.

**Emergency Work**

The emergency work referred to above may include the replacement of warning lights, signs and other safety items on public roads, the repair of damaged fences, repair of water supplies and other services which have been interrupted, repair to any damaged temporary works and all repairs associated with working on public roads.

**6.7 REFERENCES**

EN BS 5228-1:2009 “*Code of practice for noise and vibration control on construction and open sites*”

EN BS 4142:2014. *Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas.*

ISO 9613-2:1996. *Attenuation of Sound during Propagation Outdoors.*

UK DoT (Welsh Office) (1988) *Calculation of Road Traffic Noise (CRTN)*

WHO (2018) *Environmental Noise Guidelines for the European Region*

WHO (1999) *Guidelines for community noise*