

Industrial Unit, Sir Isaac Newton Way, Rochdale OL16 4NW

Plant Noise Impact

for Integrated Food Projects Ltd, Market Place, Kegworth, DE74 2EE

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Executive Summary

Environoise Consulting Limited has been instructed by Integrated Food Projects to provide an assessment of the noise impact of proposed fixed external plant at an existing industrial unit on Sir Isaac Newton Way, Rochdale OL16 4NW.

The key report findings are as follows:

Plant Noise Impact

- A noise survey was done between Monday 18th and Tuesday 19th July 2022 to determine representative background noise levels ($L_{A90(T)}$) at the nearest residential receptors (NSRs).
- Predicted plant noise levels meet the plant noise limit at the nearest residential receptors (NSRs) for the operational period, indicating a 'low impact' in accordance with BS4142. Therefore, no further mitigation is required.

1 Criteria

1.1 BS 4142+A1:2019

1.1.1 BS 4142:2014+A1:2019ⁱ provides a method of determining the 'impact of specific sound' on dwellings due to industrial and commercial noise sources through comparison between the measured background noise level (L_{A90}) and the noise source rating level ($L_{Ar,Tr}$) under consideration. The rating level is the specific noise level plus penalties of up to 18dB added for features to account for the character of the noise as follows:

- **Tonality:** +2dB penalty: Just perceptible; +4dB penalty: Clearly perceptible and +6dB penalty: Highly perceptible.
- **Impulsivity:** +3dB penalty: Just perceptible; +6dB penalty: Clearly perceptible and +9dB penalty: Highly perceptible.
- **Intermittency:** +3dB penalty: identifiable on/ off conditions.

1.1.2 When comparing the rating plant noise level against the background noise level, BS 4142:2014+A1:2019 provides the following noise impact descriptors:

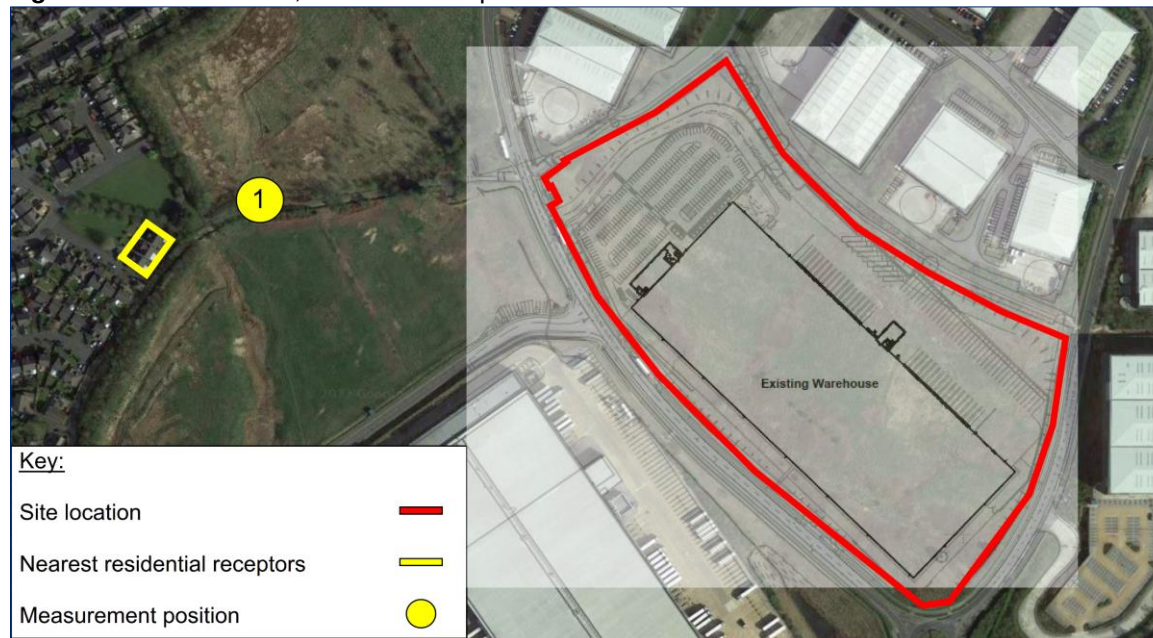
- +10dB(A) is likely to be an indicator of 'a significant impact, depending on the context'.
- +5dB(A) is likely to be an indicator of 'an adverse impact, depending on the context'.
- No excess of the background noise level is an indicator of 'a low impact, depending on the context'.

2 Noise Survey

2.1 Noise Survey Procedure

- 2.1.1 An unattended noise survey was done between 09.00hrs, Monday 18th and 11.00hrs, Tuesday 19th July 2022 to determine background noise levels ($L_{A90(15min)}$) at a position representative of the nearest residential receptors (NSRs) on Lower Lane to the west. Figure 2.1 shows the site location, measurement position and NSRs.

Figure 2.1: Site location, measurement position and NSRs.



Calibration

- 2.1.2 The sound level meter was calibrated to a level of 114.0dB before and after the survey, with no recorded drift greater than 0.5dB; therefore, the measurements are acceptable.

Weather

- 2.1.3 There was no rain and wind speeds were $\leq 5\text{ms}$; therefore, weather conditions were suitable.

Noise Environment

- 2.1.4 The dominant noise sources at the start and end of the survey were distant industrial noise from the 'ASDA' chilled distribution centre, approximately 180m to the south, and distant road traffic from the M62, approximately 730m to the south. Other noise sources included birdsong and the rustling of trees.

2.2 Background Noise Levels

- 2.2.1 To assess the impact of plant, BS 4142 requires the use of a 'representative' background noise level. We have considered this to be the lowest measured background noise level for a robust assessment. Limiting plant noise levels have been given to achieve a 'low impact, depending on the context', as per BS 4142, see Table 2.1.

Table 2.1: Limiting plant noise levels.

NSR	Period	Measured background noise level [L _{A90} (15mins) (dB)]		Limiting plant noise level [L _{A,r,T,r} (dB)]
		Range	Representative Value	
Lower Lane	24-hour	36 - 54	36	36

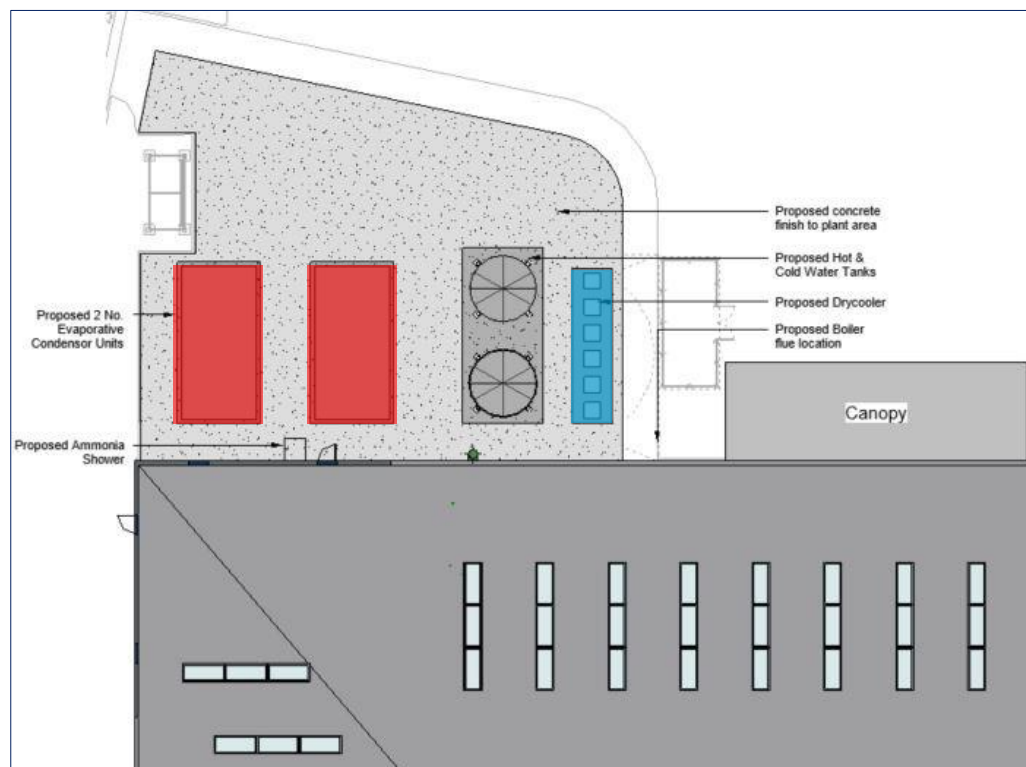
2.3 Proposed Plant Items

- 2.3.1 Details of the proposed air-to-water heat pump units are given in Table 2.2 together with associated sound pressure levels at 1m sourced from manufacturers noise data. Key colours correspond to the locations shown in Figure 2.1.

Table 2.2: Proposed plant and sound power level data (see Figure 2.1).

Key	Item	No. of units	Sound Power Level (L _{WA} [dB])
	Baltimore Aircoil VXC798 Evaporative Condenser	2	88
	Dry Cooler	1	87

Figure 2.2: Proposed external plant locations (see Table 2.2).



2.4 Assessment

2.4.1 Using the manufacture's sound data, the calculated sound pressure level at the nearest receptors ($L_{p,(NSR)}$) has been calculated as follows (plant noise calculations are shown in Figure A1, Appendix A):

$$L_p (NSR) = L_{WA} - 20 \times \log (r) - A$$

Where:

$L_p (NSR)$ = sound pressure level at the noise-sensitive receptor

L_{WA} = sound power level

r = distance of plant to receptor [i.e., 410m]

A = Building attenuation of 5dB(A)

- 2.4.2 Plant units have been considered at a height of 4.3m, based on product literature. We have considered NSR receivers to be at a height of 1.5m in the day and at a height of 4.0m in the night, representative of ground floor and first floor windows respectively.
- 2.4.3 We have considered building attenuation of 5dB for all plant units as there is no line of sight between the units and the NSR, however, we consider this to be a robust estimation.
- 2.4.4 We consider that tonal characteristics of proposed plant have the potential to be 'clearly perceptible' at the NSR, and therefore a +4dB acoustic feature correction has been applied for tonality, as per section 1.1 of this report. We consider that plant will be non-varying and that given the distance from the NSR, on-off conditions will not be identifiable. Therefore, no acoustic feature corrections have been applied for impulsivity or intermittency.
- 2.4.5 Table 2.3 presents the plant noise impact assessment to the nearest NSR.

Table 2.3: Plant noise impact assessment at the most affected residential receptors.

NSR		Operational Period (00.00 – 23.59hrs)
Lower Lane	Highest predicted specific noise level at NSR (dBA)	26
	Acoustic feature correction (dBA)	+4
	Rating plant noise level ($L_{A,T,r}$ [dB])	30
	Limiting noise level (dBA)	36
	Level of excess (dB)	0 (-6)
	BS4142 impact descriptor	Low impact

2.5 Discussion

- 2.5.1 As shown in Table 2.3, the limiting noise level is met at the NSR for the operational period, indicating a 'low impact' in accordance with BS4142. Therefore, no further mitigation is required.

Appendix A: Calculations

Figure A1: Plant noise impact calculation.

 Plant Impact Calculation Spreadsheet (only fill out sections highlighted in green)						
Source	Source Height (m)	SWL (dB)	SPL at 1m	Measurement Distance (m)		
Evap Condenser	4.3	88.0	80.0	1.0		
Evap Condenser	4.3	88.0	80.0	1.0		
Dry Cooler	4.3	87.0	79.0	1.0		
-	0	0.0	0.0	1.0		
-	0	0.0	0.0	1.0		
Period (s)	Distance to NSR (m)	Rating Penalty (dB)	No. of Events			
3600.0	410.0	0.0	3600.0			
3600.0	410.0	0.0	3600.0			
3600.0	410.0	0.0	3600.0			
0.0	0.0	0.0	0.0			
0.0	0.0	0.0	0.0			
Calculation for Rating Level						
Source 1 noise level (dB)	80.0	Source 2 noise level (dB)	80.0	Source 3 noise level (dB)	79.0	Source 4 noise level (dB)
Distance Attenuation (dB)	52.3	Distance Attenuation (dB)	52.3	Distance Attenuation (dB)	52.3	Distance Attenuation (dB)
Barrier Attenuation (dB)	5.0	Barrier Attenuation (dB)	5.0	Barrier Attenuation (dB)	5.0	Barrier Attenuation (dB)
Rating Penalty (dB)	0.0	Rating Penalty (dB)	0.0	Rating Penalty (dB)	0.0	Rating Penalty (dB)
Rating Level (dB)	22.7	Rating Level (dB)	22.7	Rating Level (dB)	21.7	Rating Level (dB)
Combined Totals						
All Sources (dB)	25.8					

References

ⁱ BS4142:2014+A1:2019 'Methods for rating or assessing industrial and commercial sound', 2014.