MR ACOUSTICS

ACOUSTIC TESTING, DESIGN & CONSULTANCY SERVICES

Cottage Cheese Extension Noise Statement

Test address
Glenfield Industrial Estate, Perth Road, Cowdenbeath

Prepared for
Grahams the Family Dairy

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Introduction:

Graham's the family dairy own and operate the Glenfield dairy located at Glenfield Industrial Estate, Cowdenbeath. The dairy produces a range of soft cheeses including cottage cheese, protein 22 and Skyr which are dispatched to retailers throughout Scotland and the United Kingdom.

Due to an increase in demand for their cottage cheese, the dairy site is looking to increase production at the dairy site. In order to increase production, the dairy site is looking to install 2 additional vats along with 6 tanks. These proposed additional items are intended to be enclosed in a gable end extension to the east of block 1 as seen in Figure 1 below.

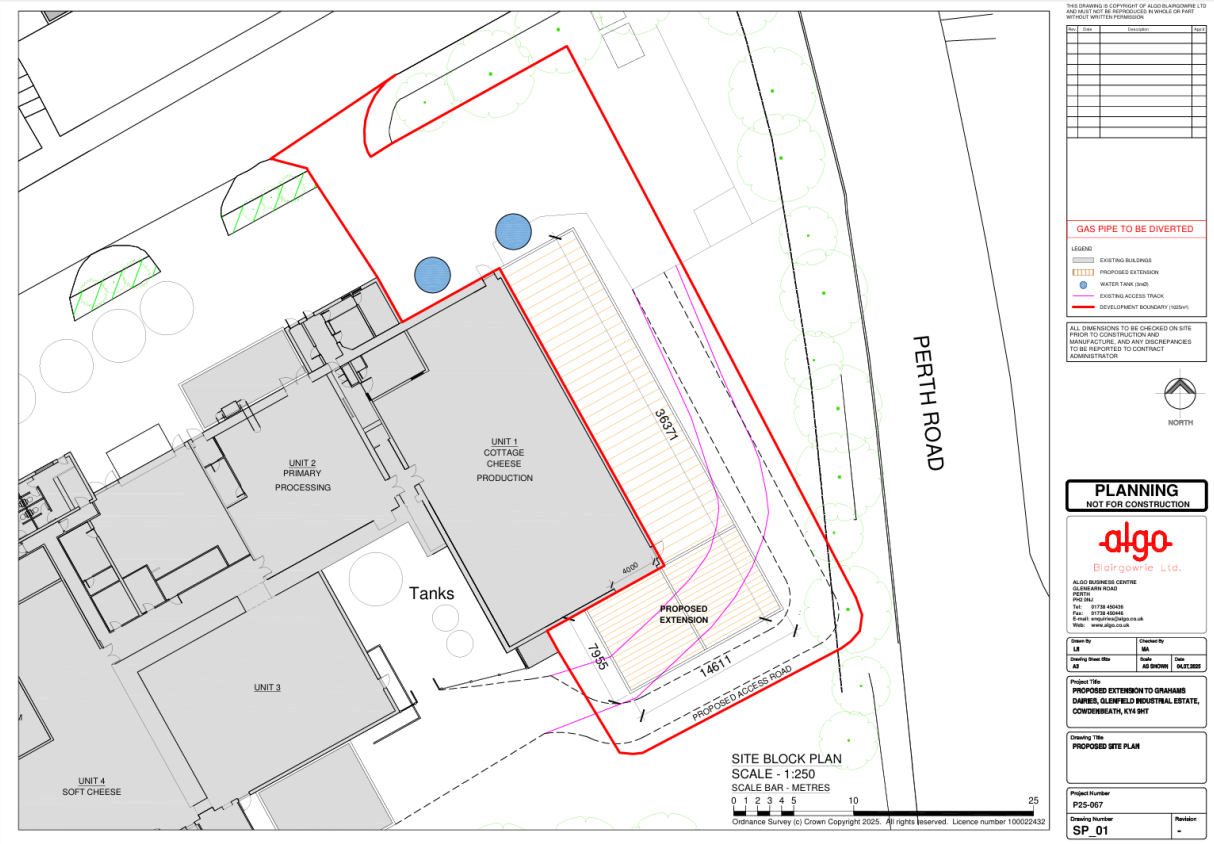

Figure 1: Proposed Extension to Cottage Cheese Building

As part of the works, the existing water tank will require to be relocated to the north of the proposed extension along with an additional water tank. This additional water tank should then provide sufficient water for dairy operations and help combat issues where the water tank was running low causing cavitation bubbles within the pump. This caused increased levels of noise at the existing water silo.

Noise Sources Associated with the Extension:

It is understood that the main sources of noise associated to the proposed extension will be as follows;

- Internal noise breakout through the building fabric
- Extract ventilation
- Water pump noise

Internal Noise Breakout Through the Building Fabric

Noise within the existing cottage cheese production area (Unit 1) was measured at an internal reverberant level of 80.6dB(A). MR Acoustics anticipate that the proposed extension will likely be at a lower operational noise level due to having half the number of vats.

It is understood that this source noise level will transmit through the building fabric and break out into the atmosphere where it will radiate as noise to nearby noise sensitive receptors.

Extract ventilation

Another potential noise source will be the extract system. Due to high humidity levels within the cottage cheese production area, humid air requires to be extracted out the building. This currently is the case for Unit 1 with 4 extract fans located on the roof of the existing building. Air is then drawn into the cottage cheese room (Unit 1) via 4 passive vents (two on the gable end of the building, one at the rear and one at the front of the building).

It is understood that three of the existing vents will be covered by the proposed extension leaving one existing vent to the cottage cheese room (Unit 1). The extension will then have 5 smaller passive louvers installed to provide adequate fresh air supply to the proposed extension area and Unit 1. It is understood that the existing roof extract systems on the cottage cheese building are sufficient, as such no further mechanical extracts are proposed.

Water Pump

As part of the application, the existing water pump will be relocated to the north façade of Unit 1 with an additional water silo proposed. At this stage, clarification has not been made confirming if the two silos will have a single water pump or an individual pump.

Recommendations:

Noise Breakout from Proposed Extension

In order to ensure no increase in noise level at nearby noise sensitive receptors, MR Acoustics advice that the sound insulation of the building fabric be at least 5dB R_w higher than the existing building fabric of Unit 1. Between the increased building sound insulation, lower overall surface area and anticipated lower internal noise level. MR Acoustics expect the cumulative noise breakout levels to cumulate to approximately 10dB below that of the existing cottage cheese building. This should be sufficient to ensure no detriment to the noise climate at nearby noise sensitive receptors.

Noise breakout from the fire exit should be minimised by ensuring the door remains closed at all times, except in the event of an emergency or scheduled fire drill. The door should be fitted with appropriate acoustic seals to prevent gaps at the frame, which could otherwise compromise the integrity of the building envelope as a barrier to noise transmission.

Extract ventilation

It is recommended that each passive vent proposed have an acoustic rating of at least 5dB higher than the specification of the existing vents. This is to ensure the cumulative level of noise breakout form the proposed extension and existing Unit 1 does not exceed current levels.

Water Pump

As mentioned within the introduction section of this statement, the proposal includes a second water silo which will help combat current issues with water demand leading to the water pump running dry and causing cavitation bubble noise within the pipework. The increase in water storage will help to combat this issue reoccurring in the future leading to a reduced level of noise.

The proposals also will see the water silos and pumps located further away between the source and receiver which will benefit from increased distance attenuation.

Should the proposals include a new water pump or two water pumps, the cumulative level form all pumps should not exceed the current levels experience form the existing water pump. This is to ensure no increase in noise level at nearby noise sensitive receptors.

Conclusion:

Based on the information available at the time of assessment and initial review of the planning application, MR Acoustics has identified the primary noise sources associated with the proposed extension and has provided recommendations to mitigate potential noise impacts. These recommendations address noise breakout from the building fabric, ventilation systems, and water pump operations.

It is anticipated that, with the implementation of the outlined mitigation measures, the proposed development will not result in any adverse impact on the existing noise environment at nearby sensitive receptors.

It should be noted, however, that the recommendations provided within this statement are based on preliminary design details and assumptions regarding operational conditions. Should the local authority require a more detailed evaluation, a full Noise Impact Assessment (NIA) involving on-site measurements and detailed modelling would be necessary to validate and refine the findings of this statement.

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Appendix A Acoustic Glossary

Terminology	Description
Airborne sound	Airborne sound is sound which is propagated from a noise source through the medium of air. Examples of these are speech and sound from a television.
C	A sound insulation adjustment, commonly used with R_w and $D_{nT,w}$. C adjusts for sources of mid-high frequency noise sources generated by typical living activities such as talking, music, radio, TV, children playing, etc. This term is used to provide information about the acoustic performance at different frequencies, as part of a single number rating system.
C_{tr}	A sound insulation adjustment, commonly used with Rw and $D_{nT,w}$. C_{tr} adjusts for low frequency noise, like noise from trucks and subwoofers. C_{tr} values typically range from about -4 to about -12. This term is used to provide information about the acoustic performance at different frequencies, as part of a single number rating system.
C_i	An impact sound insulation adjustment (spectrum adaptation term) for footfall noise. Commonly used with $L_{n,w}$ and $L'_{nT,w}$. This term is used to provide information about the acoustic performance at different frequencies, as part of a single number rating system.
D_{nT}	Standardised level difference Level difference, in decibels, corresponding to a reference value of the reverberation time in the receiving room. For dwellings, the reference value of the reverberation time is 0.5 s.
$D_{nT,w}$	Weighted Standardised Level Difference A single-number quantity (weighted) which characterises the airborne sound insulation between two rooms, in accordance with BS EN ISO 717-1: 1997. $D_{nT,w}$ is typically used to measure the on-site sound insulation performance of a building element such as a wall, floor or ceiling.
dB (decibel)	Defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10-5Pa).
Frequency (Hz)	Number of cycles of a wave in one second measured in Hertz.
Impact sound	Impact sound is sound which is propagated from a noise source through a direct medium. An example of this is footfall on a floor
L'_{nT}	Standardised impact sound pressure level Impact sound pressure level reduced by a correction term which is given in decibels, being ten times the logarithm to the base 10 of the ratio of the measured reverberation time of the receiving room to the reference reverberation time. For dwellings, the reference value of the reverberation time is 0.5 s.
$L'_{nT,w}$	Weighted, Standardised Impact Sound Pressure Level A single-number quantity (weighted) to characterise the impact sound insulation of floors, in accordance with BS EN ISO 717-2: 1997. $L'_{nT,w}$ is measured on site. The lower the $L'_{nT,w}$, the better the acoustic performance.
RT or T_{60}	Reverberation Time The time (in seconds) taken for the sound pressure level generated by a particular noise incident to decay by 60 decibels following the conclusion of the noise event (hence T60 abbreviation). Reverberation Time is used for assessing the acoustic qualities of a space, describing how quickly sound decays within a space. The reverberation time is related to the room volume and total absorption.

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