REPORT



Noise Impact Assessment

Project Title: Royal Liver Basement Plant

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AWN Consulting Ltd, The Tecpro Building, IDA Business & Technology Park, Clonshaugh, Dublin 17, D17 XD90

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Details	Written by	Approved by
Signature		
Name	Alistair Maclaurin	Dermot Blunnie
Qualifications	BSc MIOA	BA BAI PHD MIEI MIOA
Title	Senior Acoustic Consultant	Director (Operations)
Date	23 September 2026	

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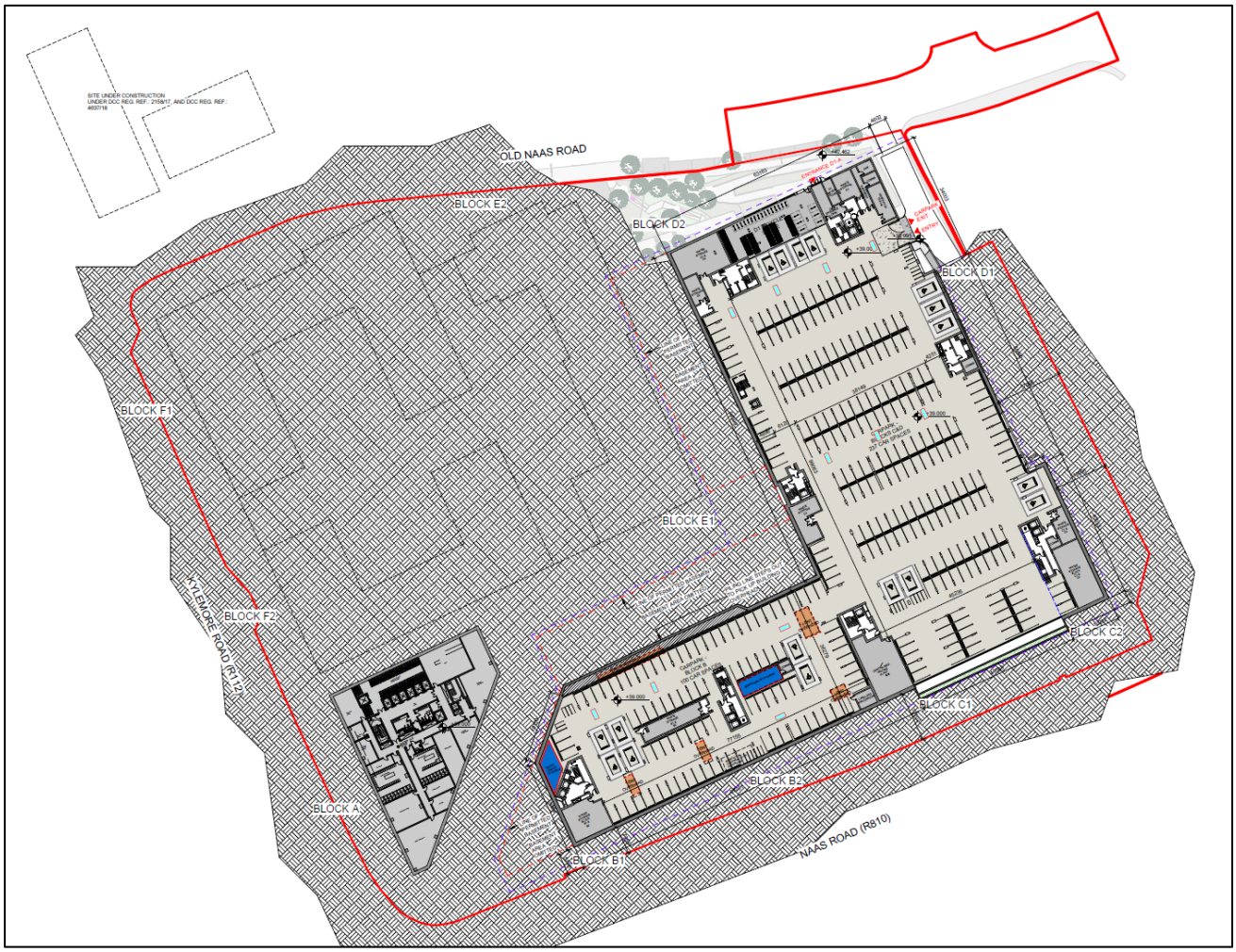
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1. INTRODUCTION

AWN Consulting, a Trinity Consultants Company, has been commissioned to prepare a noise impact assessment relating to the plant located within the proposed basement car park area for Phase 2 of the Royal Liver Project. A plan view of the proposed underground car park is presented in Figure 1-1.

Figure 1-1. Proposed Car Park



The assessment has been undertaken using the following methodology:

- Criteria have been drawn from the original EIAR with planning reference 4238/19;
- Calculation of predicted noise levels associated with the operation the proposed plant has been undertaken;
- Comparison of the proposed plant noise levels with the conditioned criteria have been made with effects determined as per the descriptors set out in the EPA EIAR guidelines.

2. CRITERIA

The EIAR submitted as part of the original planning application (ref. 4238/19) has already set out criteria for plant noise emissions from the site. The noise thresholds are based on guidance drawn from BS4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*, and these are reproduced in Table 2-1.

Table 2-1. Proposed Noise Criteria for Plant Noise

Location	Day, dB $L_{Aeq,1hr}$	Night, dB $L_{Aeq,15min}$
External Receptors	50	44
Apartments within the Proposed Development	55	45

3. NOISE ASSESSMENT

The assessment of noise takes into consideration the predicted noise level at the internal noise receptor located closest to a ventilation location for the car park. In this instance it has been calculated that the closest receptor will be at a distance of approximately 5m from a basement car park vent.

3.1 Calculation Inputs and Assumptions

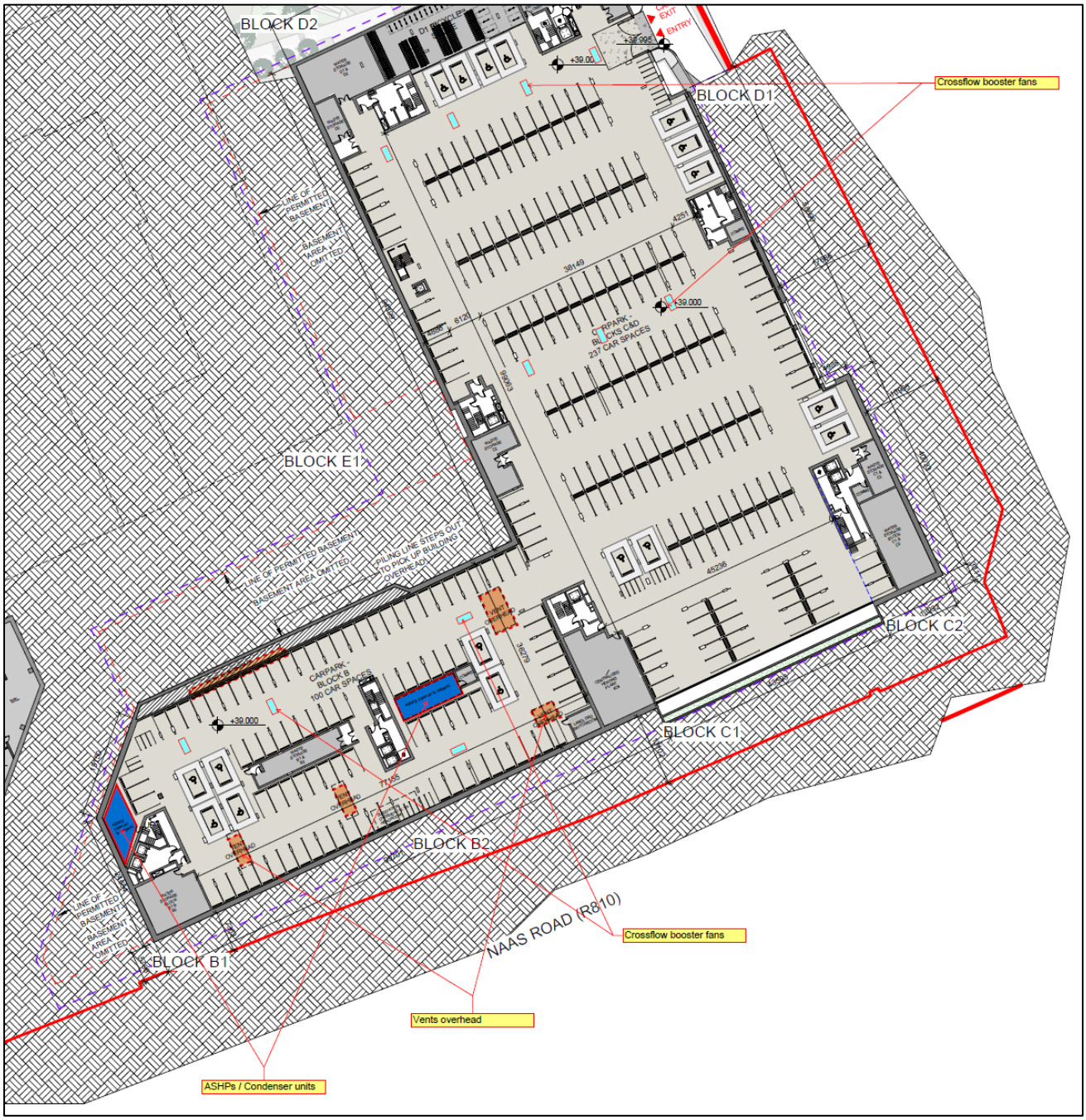
The following assumptions have been made with regards to the plant items:

- Car park ventilation fans run at a high rate for three minutes if CO_2 levels reach a threshold. They run at the low rate for the remainder of the 15 minute period. A total number of 11 are assumed for this assessment.
- As the future tenants of the retail spaces are as of yet unknown it is not known what other plant items will be situated in the basement area. In this instance it has been assumed that a total of six heat pumps will be situated in the basement.
- A nominal reduction of 10 dB through the installation of an acoustic louvre is assumed at the vents.
- Plant locations are as presented in Figure 3-1.
- Assumed noise levels of the plant items are set out in Table 3-1.

Table 3-1. Plant Noise Data

Item	Source Noise Level
Booster Ventilation Fans at High Rate (based on IDV-HC-50-v2)	69 dB(A) at 3 m
Booster Ventilation Fans at Low Rate (based on IDV-HC-50-v2)	51 dB(A) at 3 m
Air Source Heat Pump (based on PURY-EP650YSNW-A2)	59.7 dB(A) at 10 m

Figure 3-1 Basement Plant Locations



3.2 Discussion of Results

Taking account of the previously presented input parameters, including the noise reduction provided by the acoustic louvre, the calculated noise level at the closest receptor location is 42 dB $L_{Aeq,15mins}$. Comparison of the predicted noise level with the most conservative night criteria of 45 dB $L_{Aeq,15mins}$ concludes that there will not be a significant impact. The associated effect is therefore determined to be Negative, Not Significant and Long Term.

The calculations demonstrate that compliance with the criterion is achievable using the assumed plant and acoustic louvre performance. Other mitigation measures may also be suitable such as quieter plant selection, at source mitigation or alternate louvre locations. As the final plant selection is not yet known,

the assessment will require verification at the detailed design stage to confirm the necessary plant sound levels and mitigation performance.

4. CONCLUSION

An assessment of noise impacts associated with the proposed plant located within the basement car park of Phase 2 of the Royal Liver Project has been undertaken.

Plant noise emissions have been assessed against the criteria established as part of the original EIAR planning submission (planning ref. 4238/19). The assessment has considered noise from the proposed car park ventilation fans and assumed air source heat pumps.

The results indicate that the predicted noise level at the closest apartment will be 42 dB $L_{Aeq,15min}$. This is below the most conservative night-time criterion of 45 dB $L_{Aeq,15min}$.

Further assessment will be undertaken at detailed design stage when plant selections are known.

The resulting noise effect is therefore determined to be Negative, Not Significant and Long Term.