

32 St Mary's Butts
Reading
RG1 2LS

Environmental Noise Survey and
Noise Impact Assessment Report

25 July 2024

Client: Reading 2023 Ltd

Ref:QA24280/NIA

Document Control

Document Information

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Document Approvals

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For Information

Please Note

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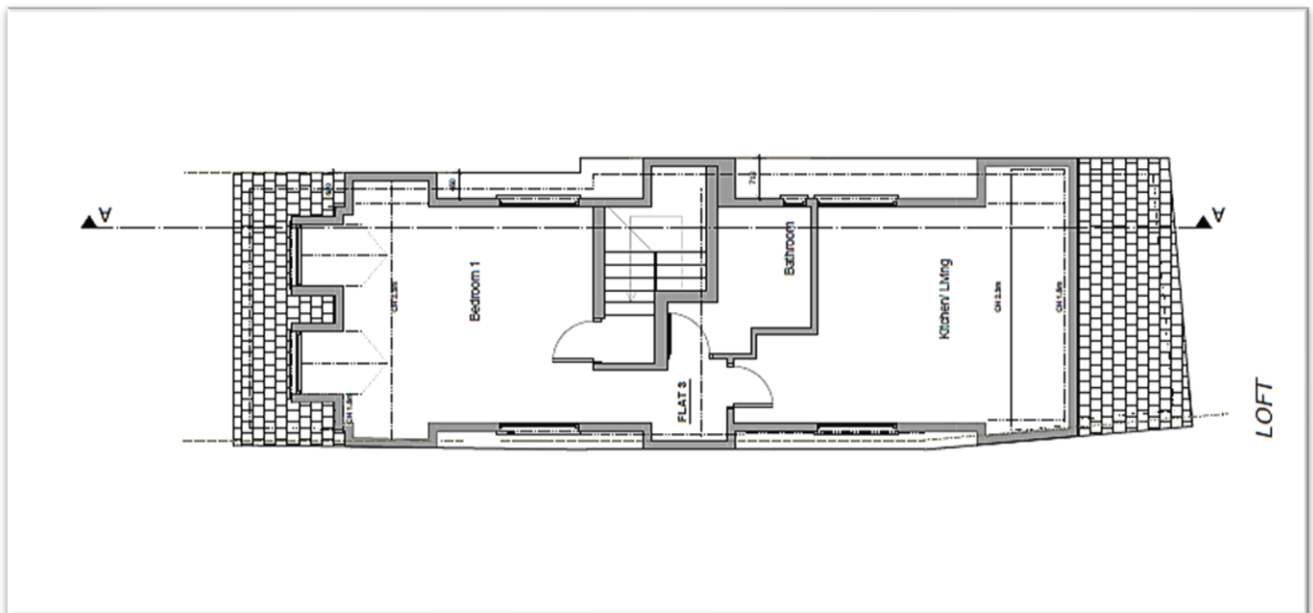
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1.0 INTRODUCTION

- 1.1 Quantum Acoustics Ltd has been commissioned to prepare a Noise Assessment report for a new residential flat within the roof area of 32 St Mary's Butts, Reading RG1 2LS.
- 1.2 Reading Borough Council has approved the proposed residential dwelling with a condition and legal agreements under Planning Decision Notice - Application No: 231229.
- 1.3 This report presents the results of the noise survey undertaken at the site to determine existing environmental noise levels; this includes consideration of the ambient noise levels and the likely noise impact within the dwelling in accordance with Condition 10.

2.0 PROPOSED DEVELOPMENT

- 2.1 The proposed development works includes provision of a mansard extension with dormer windows to create one additional self-contained 1-bedroom flat.
- 2.2 The proposed general arrangement of the dwellings and red line boundary is shown in the figure below.



3.0 PLANNING CONDITIONS

- 3.1 In accordance with the Planning Decision Notice - Application No: 231229, the development is subject to the following condition related to noise:

Condition 10

"No development shall commence on site until a detailed scheme, informed by an assessment of the current noise environment, for protecting the dwellings from the external noise environment of the area has been submitted to and approved, in writing, by the Local Planning Authority. The scheme itself shall be designed, specified and constructed so that the sound insulation performance of the structure and the layout of the dwellings are such that the indoor ambient noise levels do not exceed the values detailed in Table 4 of BS 8233:2014 and the LMAX value stated. Where opening windows will lead to an internal noise level increase of 5 dBA or greater above BS 8233:2014 recommended internal levels, the scheme shall include provision of alternative mechanical ventilation with minimum performance equivalent to a mechanical heat recovery (MVHR) system with cool air bypass as an alternative means of cooling and ventilation. Noise from the system should not result in BS8233 internal levels being exceeded.

Thereafter, the development shall not be carried out other than in accordance with the approved scheme which shall be completed before any part of the accommodation hereby approved is occupied, unless the Local Planning Authority otherwise agrees in writing.

REASON: These details are required due to insufficient information being contained within this submission and in order to safeguard the amenity of occupants in accordance with Policy CC8 of the Reading Borough Local Plan 2019."

3.2 Table 4 of BS 8233:2014 is summarised below;

Condition 10 Requirements			
Activity	Location	Daytime (07.00 to 23.00 hours)	Night-time (23.00 to 07.00 hours)
Resting	Living Room	35dB $L_{Aeq,16hour}$	--
Dining	Dining Room/Area	40dB $L_{Aeq,16hour}$	--
Sleeping	Bedroom	35dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$ 45 dB $L_{Amax,F}$

3.3 The internal ambient noise levels criterion as outlined in BS 8233:2014 align with the WHO guidelines. Given that BS 8233:2014 does not have specific L_{AFmax} criteria, the WHO's 45dB L_{AFmax} criterion has been applied for this assessment.

3.4 For night-time noise levels, the WHO advises that indoor sound pressure levels should ideally not surpass 45 dB L_{AFmax} more than 10-15 times per night to facilitate good sleep. Therefore, when evaluating night-time L_{AFmax} noise events, adopting the 10th highest L_{AFmax} noise event within the typical night-time span of 23:00 to 07:00 is considered appropriate. We have therefore assumed this is applicable to the condition above.

4.0 EXISTING NOISE LEVELS

General

- 4.1 Automated noise monitoring within the site was undertaken over a four-day period between 20 January 2023 to 24 January 2023.
- 4.2 Noise monitoring was undertaken at two measurement locations, as shown in the figure below.



Location	Description
LT1	Located 1m outside of the 2nd floor windows overlooking the front of the building.
LT2	Located 1m outside of the 2nd floor windows overlooking the rear of the building.

General

- 4.3 The noise monitoring equipment at Positions LT1 and LT2 were configured to record the L_{A90} , L_{Aeq} , and $L_{Amax,fast}$ sound pressure levels over consecutive 15-minute periods to provide a detailed time history profile showing fluctuations in noise levels. The equipment was also configured to undertake higher resolution logging, to assist with the identification of noise events.

Instrumentation

- 4.4 Details of the equipment used for the survey are summarised below.

Measurement Instrumentation			
Position	Manufacturer	Type	Serial Number
LT1	Svantek	971A	124647
LT2	Svantek	971A	24770
Calibrator	Svantek	SV 33B	125699

- 4.5 All instruments hold current laboratory calibration certificates (available on request).
- 4.6 A field calibration checks on all equipment was made at the start of the survey and a further calibration check made on completion. No significant drift in the calibration of any instrument was observed.

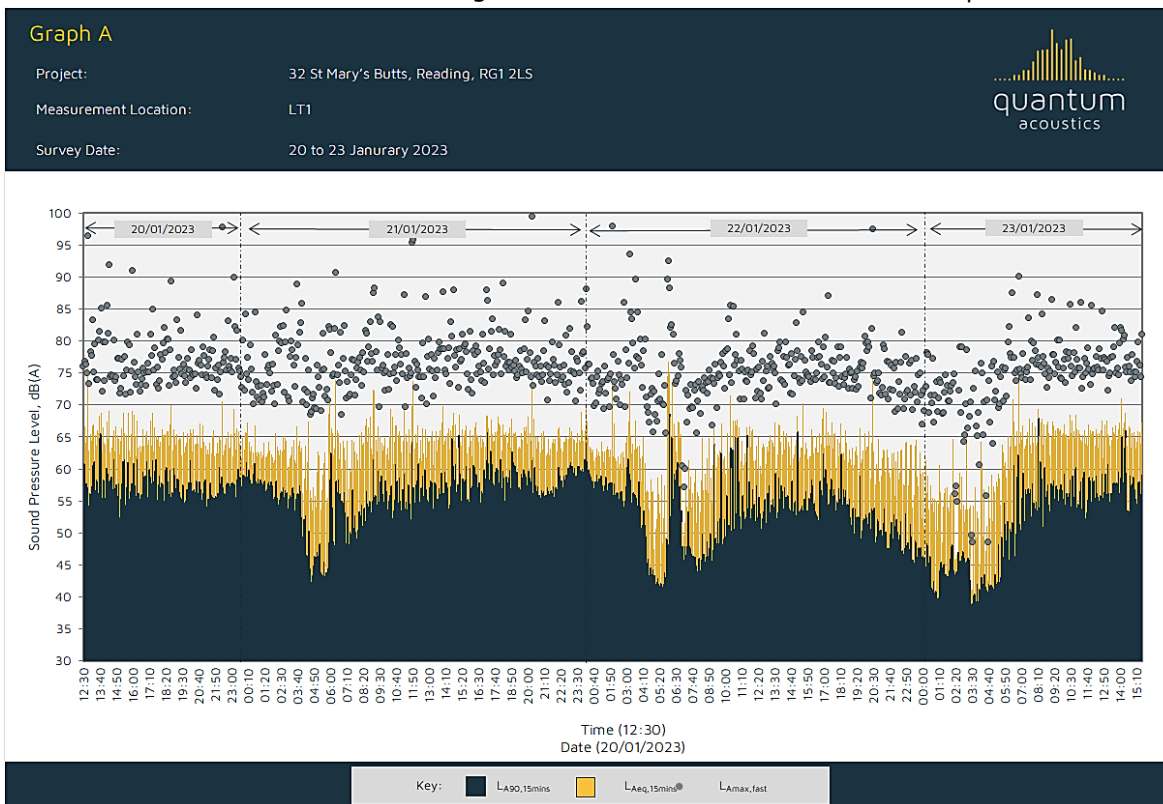
Weather

Weather conditions for most of the survey were dry with light winds and therefore deemed suitable for the measurement of environmental noise.

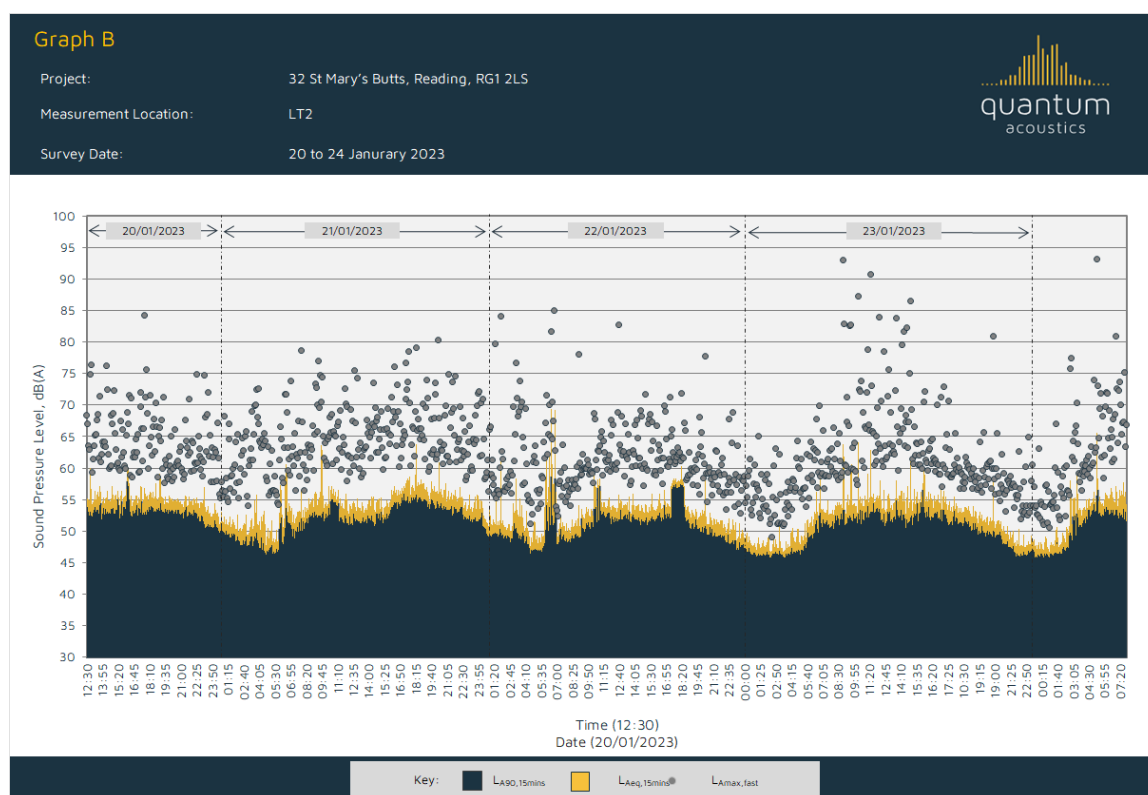
Results

- 4.7 Detailed graphs showing the A-weighted L_{A90} , L_{Aeq} and $L_{Amax,fast}$ sound levels measured are presented as follows.

4.8 The results of the noise monitoring from Position LT1 are shown in Graph A below.



4.9 The results of the noise monitoring from Position LT2 are shown in Graph B below.



- 4.10 A summary of the measured daytime ($L_{Aeq,16\text{ hour}}$) and night-time ($L_{Aeq,8\text{ hour}}$) are presented in the table below. These values represent noise levels from all noise sources (i.e. transportation noise sources, noise from neighbouring recreational uses and any noise generated by existing commercial and environmental sources operating adjacent to the site.

Measured $L_{Aeq,T}$ Noise Levels		
Position LT1	Daytime Noise Level, $L_{Aeq,16\text{ hour}}$ (dB) (07:00 – 23:00)	Night-time Noise Level, $L_{Aeq,8\text{ hour}}$ (dB) (23:00 – 07:00)
20 Jan 2023	66 dBA*	64 dBA
21 Jan 2023	66 dBA	65 dBA
22 Jan 2023	64 dBA	61 dBA
23 Jan 2023	66 dBA*	-
Position LT2	Daytime Noise Level, $L_{Aeq,16\text{ hour}}$ (dB) (07:00 – 23:00)	Night-time Noise Level, $L_{Aeq,8\text{ hour}}$ (dB) (23:00 – 07:00)
20 Jan 2023	56 dBA*	53 dBA
21 Jan 2023	56 dBA	56 dBA
22 Jan 2023	54 dBA	50 dBA
23 Jan 2023	55 dBA	51 dBA
24 Jan 2023	56 dBA*	-

Denotes partial measurement periods*

- 4.11 The measurement data for Positions LT1 and LT2 value been processed for each complete day/night-time period during the monitoring period and averaged to provide typical daytime $L_{Aeq,16\text{ hour}}$ levels, night-time $L_{Aeq,8\text{ hour}}$ levels and night-time $L_{Amax,fast}$ levels. The calculated noise levels are summarised in the table below:

Measured Typical Noise Level			
Measurement Location	Daytime Noise Level, L _{Aeq,16hour} (dB)	Night-time Noise Level, L _{Aeq,8 hour} (dB)	Night-time 10 th Highest Max L _{Amax,fast}
Position LT1	65	65	83
Position LT2	55	56	67

5.0 INDOOR AMBIENT NOISE LEVELS

- 5.1 Façade and room dimensions for sample dwellings have been taken from the design drawings prepared by the Architects which accompany the application.
- 5.2 The sound insulation capabilities of a particular building façade are determined by the sound insulation of the individual construction components. The acoustic performance of the windows will typically determine noise intrusion in masonry exterior walls with windows.
- 5.3 It should be noted that the relative proportion of the building elements will also influence the sound insulation capabilities of any façade. As an external area increases, so does the need for sound insulation. When the proportional area of weaker performing elements is increased, such as windows, the amount of sound insulation required will also increase.
- 5.4 It is assumed that external walls will maintain the following sound reduction index performance:

Octave Band Sound Reduction Index, dB for External Walls					
125	250	500	1k	2k	4k
41	43	48	50	55	55

- 5.5 For calculation purposes, it is assumed that all rooms will have a reverberation time of 0.5 seconds, in line with the standardised reverberation time implemented in Approved Document E of the Building Regulations 2010 (as amended).
- 5.6 The acoustic performance values are specified in terms of the "Weighted Sound Reduction Index" (R_w) as determined in accordance with BS EN ISO 10140-2:2021: *"Acoustics. Laboratory Measurement of Sound Insulation of Building Elements. Measurement of Airborne Sound Insulation."* and BS EN ISO 10140-4:2021: *"Acoustics. Laboratory measurement of sound insulation of building elements. Measurement procedures and requirements"* and rated in accordance with BS EN ISO 717-1: 2020: *"Acoustics. Rating of Sound Insulation in*

Buildings and of Building Elements – Airborne Sound Insulation”. The sound reduction index relates to the composite performance of the complete window system including the glass, framing, mullions, transoms, seals, etc.

- 5.7 An assessment of the internal ambient noise levels within the dwelling with a partially open window has been undertaken.
- 5.8 The following table summarises the predicted daytime and night time internal ambient noise levels, assuming a partially open window achieves a typical 13dB noise reduction.

Elevation	Measured Daytime Noise Level, L _{Aeq,16hour} (dB)	Predicted Internal Noise Level (Windows Open) L _{Aeq} (dBA)
East	65	52
West	55	42
Elevation	Measured Nighttime Noise Level, L _{Aeq,8hour} (dB)	Predicted Internal Noise Level (Windows Open) L _{Aeq} (dBA)
East	64	51
West	53	40

- 5.9 The internal noise levels from partially openable window are predicted to result in a level difference of above 5dB(A) when compared to the noise level criteria detailed in BS8233:2014 as referenced in Planning Condition 10. The proposed dwelling should therefore be fitted with an MVHR system with cool air bypass as an alternative means of cooling and ventilation as per Planning Condition 10.
- 5.10 The incident noise levels from environmental and commercial sources have been provided in the section above. Based on this we have calculated the required minimum sound reduction indices of the glazing on each façade in order to achieve the acoustic criteria detailed in Planning Condition 10.
- 5.11 The room on the western façade (overlooking St Marys Butts) are predicted to require the following minimum glazing performance.
- Windows – minimum rating of R_w 30dB. (This could typically be achievable with double glazed units comprising of 4mm glass / 16mm air / 4mm glass)
 - MVHR - (system 4) Ventilation.

5.12 The room on the eastern of the site, (overlooking Blue Collar Corner) are predicted to require the following minimum glazing performance.

- Windows – minimum rating of R_w 33dB. (This could typically be achievable with double glazed units comprising of 4mm glass / 16mm air / 6mm glass)
- MVHR - (system 4) Ventilation.

5.13 The room on the north and south of the site, are predicted to require the following minimum glazing performance.

- Windows – minimum rating of R_w 37dB. (This could typically be achievable with double glazed units comprising of 6mm glass / 16mm air / 8mm glass)
- MVHR - (system 4) Ventilation.

Assessments of Existing Glazing / External Facade

- 5.14 The following table summarises the predicted internal noise levels on the east façade (overlooking St Marys Butts) façade during the daytime based upon the proposed glazing/ventilation system.

Location	Proposed Daytime Criterion L _{Aeq} (dBA) (07.00 to 23.00 hours)	Predicted Internal Noise Level L _{Aeq} (dBA)
Living Room	35	35
Dining Room/Area	40	35

- 5.15 The following table summarises the predicted internal noise levels on the western facade (overlooking Blue Collar Corner) façade during the daytime based upon the proposed glazing/ventilation system.

Location	Proposed Daytime Criterion L _{Aeq} (dBA) (07.00 to 23.00 hours)	Predicted Internal Noise Level L _{Aeq} (dBA)
Bedroom	35	25

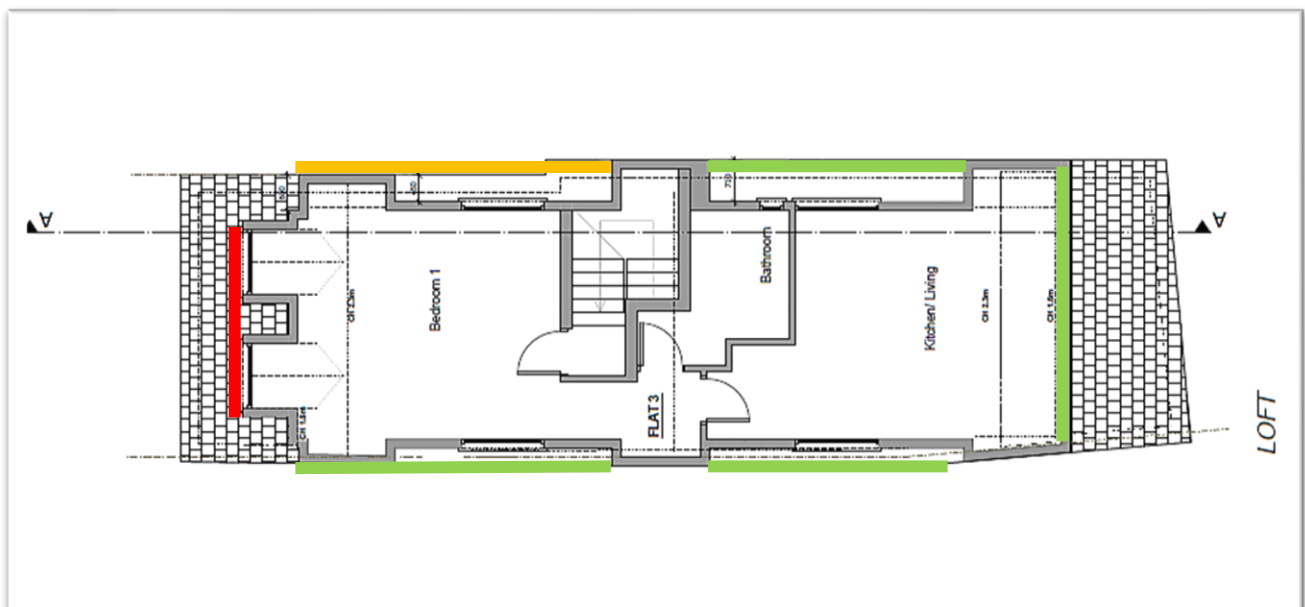
- 5.16 The following table summarises the predicted internal noise levels on the western façade during the nighttime based upon the proposed glazing/ventilation system.

Location	Proposed Night-time Criterion (dBA) (23.00 to 07.00 hours)	Predicted Internal Noise Level (dBA)
Bedroom	30 L _{Aeq}	23 L _{Aeq}
	45 L _{Amax}	44 L _{Amax}

- 5.17 Calculated performance requirements are shown below to give preliminary performance classifications.

Window Sound Reduction Index Requirements	
Type	Weighted Sound Reduction Index (R'_w), dB
A	30
B	37
C	33

- 5.18 A preliminary specification and zoning of window acoustic performance requirements is presented in the figure below.



Sound Reduction of the Glazing

- 5.19 The following table presents the recommended minimum sound reduction indices for new windows to residential internal areas.

Minimum Sound Reduction Index (R_w) at Octave Band Centre Frequencies (Hz)								
R_w	63	125	250	500	1k	2k	4k	8k
30	21	24	18	26	40	45	39	41
33	17	20	20	30	40	35	44	46
37	17	20	27	37	43	36	51	53

- 5.20 It is the responsibility of the glazing manufacturer and/or supplier to demonstrate and achieve compliance with the above minimum octave band values.
- 5.21 Testing of the whole window should be accordance with BS 476-22:1987 and BS EN 1364-1:2015 from an independent UKAS accredited or international equivalent laboratory, with reports provided to Quantum Acoustics for review.
- 5.22 It is therefore concluded that the proposed development can be readily designed to deliver acceptable indoor noise levels for future residents in accordance with Condition 10.

6.0 CONCLUSIONS

- 6.1 Quantum Acoustics have undertaken a fully automated environmental noise survey to establish the existing acoustic climate around the site at 32 St Mary's Butts, Reading RG1 2LS.
- 6.2 It is concluded that noise intrusion into the proposed additional flat should be readily controllable through the use of glazing and mechanical ventilation achieving at least R_w 30 for the eastern façade, R_w 37 for the northern and southern facade, and R_w 33 for the western facade.
- 6.3 It is concluded that the proposed development should not raise any residual significant or other adverse impacts on the health and/or quality of life for the occupants.
- 6.4 The proposed development therefore fully complies with Condition 10 of the Planning Decision Notice - Application No: 231229.



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