
10.0 APPENDIX B – TM59 OVERHEATING REPORT



Blackwell Farm Road

Overheating Report

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1 EXECUTIVE SUMMARY

Kench Consultants Limited (KCL) have been instructed to undertake an Overheating Analysis Assessment supporting the planning submission for the Blackwell Farm Road 10 Plot development.

This report summarises the process undertaken and outlines the results of the overheating analysis, whilst describing any measures which may be required to ensure all occupied spaces maintain acceptable levels of thermal comfort in line with Approved Document O and CIBSE Technical Memorandum 59 (TM59) "Design methodology for the assessment of overheating risk in homes" guidance.

In line with the Approved Document Part O and TM59, all of the proposed dwellings at Blackwell Farm Road have been assessed as being predominantly naturally ventilated on the basis that there are good opportunities for natural ventilation across all occupied spaces. The majority of openable windows are openable to a maximum distance of 650mm (where appropriate) unless stated within the projects acoustic report, where this has been restricted to all south facing rooms to have fixed closed windows during the assessment.

To mitigate against the risk of falling from height, all openable windows which form part of the overheating strategy must be guarded to a height of 1100mm in line with the requirements of Approved Document O. Where this is not the case, the windows must be treated with additional guarding (e.g. fixed louvres) or restricted to a maximum distance of 100mm via a proprietary limiting device. This guidance has been strictly followed as part of the assessment.

A detailed Noise Impact Assessment has been undertaken by Acoustic Associates (Report Ref. J3201, June 2021) to support the development. The assessment confirms that the site is subject to a soundscape dominated by road traffic noise from the A264, which runs directly to the south of the proposed dwellings. As part of the acoustic design, the properties have been set back approximately 20 metres from the roadside, and no side-facing habitable rooms directly overlook the A264.

The report concludes that, due to elevated sound pressure levels along the A264-facing façades, windows serving rooms in Plots 1–6 that overlook this road should not be relied upon for background ventilation. Opening windows on this façade would lead to internal noise levels exceeding BS8233:2014 criteria. However, windows to the rear of Plots 1–6 and both front and rear façades of Plots 7–10 are deemed suitable for opening and provide compliant Natural ventilation without breaching acoustic thresholds.

Calculations in accordance with BS8233:2014 demonstrate that all dwellings can meet internal noise criteria using standard thermal double glazing ($R_{\text{traffic}} < 25 \text{ dB}$), it was also deemed that Mechanical Ventilation Heat Recovery (MVHR) is to be utilised throughout each dwelling which will enable fresh air to be supplied into each property with the assistance of in line attenuation. This approach ensures thermal comfort and compliance with Approved Document O in areas where openable windows are acoustically constrained.

The methodology within TM59/ADO requires dwellings to achieve compliance by passing both of the following two criteria:

- **Criteria 1:**
For living rooms, kitchens and bedrooms: the number of hours during which DT is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 per cent of occupied hours. (CIBSE TM52 Criterion 1: Hours of exceedance).
- **Criteria 2:**
For bedrooms only: to guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10 pm to 7 am shall not exceed 26 °C for more than

1% of annual hours. (Note: 1% of the annual hours between 22:00 and 07:00 for bedrooms is 32 hours, so 33 or more hours above 26 °C will be recorded as a fail). In terms of achieving overall compliance with TM59/ADO, passive design techniques have been enrolled to mitigate against the risk of overheating. Each dwelling typically benefits from:

- Openable windows (varying restrictions as necessary).
- Highly insulated building envelope.
- Whole house ventilation systems to all habitable rooms afforded by Mechanical Ventilation Heat Recovery.
- Increased Window reveals to all plots to 175mm.

As part of the dynamic thermal modelling process, improved glazing with a lower solar gain coefficient (0.28 g-value) was initially tested to assess its impact on mitigating overheating risk. While the improved g-value demonstrated a measurable benefit in reducing solar gains and internal temperatures, it was ultimately not adopted in the final specification. This decision was made following consultation, as the reduced solar transmittance had a detrimental impact on the SAP compliance for each plot, particularly with respect to solar gains required to meet the Target Fabric Energy Efficiency (TFEE) and DER/TER targets. As such, the glazing specification was reverted to a balanced solution that supports both overheating performance and SAP compliance.

As part of the iterative compliance process, it has been proposed that the air permeability of all dwellings be reduced to 4.0 m³/h·m² at 50 Pa, as opposed to the original target of 5.0 m³/h·m². This change was necessary to address the impact of glazing performance on overall compliance. Specifically, it was recommended that all glazing achieve a g-value of 0.45 or better. However, this lower solar transmittance had an adverse effect on the SAP calculations, particularly in relation to solar gain and space heating demand. Reducing the air permeability to 4.0 m³/h·m² was identified as a necessary compensatory measure to maintain compliance with the SAP-derived energy performance criteria while still achieving the required overheating mitigation.

Following agreement on all feasible passive design measures with the architect, client, and wider design team, it was determined that additional mechanical mitigation would be required to ensure compliance. As such, Nuaire MR-ECO-COOL-V cooling modules which would support the MVHR units within units 1-6 were introduced into the assessment to provide tempered incoming air to habitable spaces. These units were selected due to their ability to pre-condition incoming ventilation air to approximately 24°C, thereby reducing internal peak temperatures during warmer periods without the need for dedicated comfort cooling systems. Their integration followed a whole-design-team review and was deemed the most effective and practical solution to mitigate overheating risk while maintaining compliance with ventilation and energy standards.

It should also be noted that the inclusion of the MR-ECO-COOL-V units, which have a minimum operational requirement of 60 l/s, necessitated an increase in the background (trickle) ventilation rate to maintain compliance with Approved Document F. To ensure this adjustment was proportionate, the same percentage increase typically seen between standard Part F trickle and boost rates—approximately 22% - was applied in reverse to determine an

appropriate trickle flow that aligns with the MR-ECO-COOL-V minimum. As a result, a constant background ventilation rate of 60l/s was modelled in plots 1-6, distributed evenly across habitable rooms on both the supply and extract legs. This ensures the system meets thermal comfort targets through continuous ventilation, without relying on boosted flow rates to artificially reduce overheating risk, thereby maintaining full compliance with the intent of TM59 and Approved Document O.

By implementing the above passive design techniques, the modelling demonstrates that all dwellings achieve acceptable levels of thermal comfort (detailed results are included within this report in a later section) inline with the requirements of Approved Document O:

Reference	TM59: Adaptive Method	
	Criteria 1	Criteria 2
Plot 1	Pass	Pass
Plot 2	Pass	Pass
Plot 3	Pass	Pass
Plot 4	Pass	Pass
Plot 5	Pass	Pass
Plot 6	Pass	Pass
Plot 7	Pass	Pass
Plot 8	Pass	Pass
Plot 9	Pass	Pass
Plot 10	Pass	Pass

Table 1 - Compliance Results

2 INTRODUCTION

KCL have been instructed to undertake an overheating analysis in line with Approved Document O (ADO) and CIBSE Technical Memorandum 59 (TM59) "Design methodology for the assessment of overheating risk in homes" guidance for the proposed dwellings at Blackwell Farm Road.

The proposed scheme comprises 10 dwellings.

In preparation of the overheating analysis and results presented here-within, KCL used IES Virtual Environment (version 2023.5.2.0) to produce a dynamic simulation model (DSM) of each of the dwelling. To ensure the DSM models align with the project proposals and the requirements of industry guidance, the following information was used for the purpose of the assessment:

- Architectural general arrangement/elevation/section drawings:
 - o BLF-MHA-B1-ZZ-M3-A-0001-C01-Sheet - 0111 – Floor Plans
 - o BLF-MHA-B2-ZZ-M3-A-0001-C01-Sheet - 0121 - Floor Plans
 - o BLF-MHA-B3-ZZ-M3-A-0001-C01-Sheet - 0131 - Floor Plans
 - o BLF-MHA-B4-ZZ-M3-A-0001-C01-Sheet - 0141 - Floor Plans
 - o BLF-MHA-B5-ZZ-M3-A-0001-C01-Sheet - 0151 - Floor Plans
 - o BLF-MHA-B1-ZZ-M3-A-0001-C01-Sheet - 0114 – Elevations
 - o BLF-MHA-B2-ZZ-M3-A-0001-C01-Sheet - 0124 – Elevations
 - o BLF-MHA-B3-ZZ-M3-A-0001-C01-Sheet - 0134 – Elevations
 - o BLF-MHA-B4-ZZ-M3-A-0001-C01-Sheet - 0144 - Elevations
 - o BLF-MHA-B5-ZZ-M3-A-0001-C01-Sheet - 0154 – Elevations
- Site plan:
 - o BLF-MHA-A-XX-DR-A-0100_C01-External Works & Site Plan
- Approved Document O TM59 limits:
 - o Operation of windows
 - o Consideration of noise and pollution
 - o Dwelling security measures
 - o Protection from falling
 - o Acceptable overheating mitigation strategies
- Approved Document F (Volume 1) ventilation requirements
 - o Whole dwelling ventilation
 - o Purge ventilation
- CIBSE TM59 internal gains profiles
 - o Occupancy
 - o Equipment
 - o Lighting

3 SITE LOCATION

The proposed development is located at Blackwell Farm Road, East Grinstead, RH19 3HX, and comprises ten new-build residential dwellings. The site is currently undeveloped and is designated for residential use in line with the local planning strategy.

In terms of its surroundings, the site is situated within a predominantly suburban area. It is bordered by existing low-rise residential properties to the north and east, with open green space to the west. The A264 runs along the southern boundary of the site and forms a key element of the local soundscape alongside Blackwell Farm Road itself, which is dominated by road traffic noise.

As noted in the Acoustic Associates Noise Assessment report, “opening windows for the properties with rooms overlooking the façade on the A264 will cause an increase in internal sound pressure levels which would exceed BS8233:2014 internal criterion.” However, for the rear of Plots 1–6 and both the front and rear of Plots 7–10, windows will remain openable to provide background ventilation in compliance with acoustic and ventilation requirements.

Access to the site is via Blackwell Farm Road. The surrounding area is low-density and residential in character, with minimal risk of significant overshadowing from neighbouring structures.



Figure 1 - Proposed Site Plan