

TM59 OVERHEATING REPORT



Project Address: Proposed Development at 1 Mayfair Gardens, London | N17 7LP

Prepared By:

Heyare Jayantha

Chartered Building Services Engineer / Accredited Domestic & Non-Domestic Energy

Assessor

C.Eng MCIBSE

HARITHA CONSULTANTS LIMITED

06, Sutton Plaza Sutton Crt Road SM1 4FS Sutton

M: +44 740 294 2751 | T: +44 203 137 2898 | Email : info@haritha.co.uk | Web : www.haritha.co.uk

1. INTRODUCTION

Over the past decade, the risk of overheating in homes has become a significant concern among the domestic design, construction, and provider communities. Overheated homes can cause substantial discomfort and stress for occupants, potentially leading to litigation and costly mitigation measures for owners and developers.

However, overheating is a subjective issue—the threshold at which 'hot' becomes 'too hot' varies from person to person and depends on various factors. This variability means that not all occupants will be always satisfied. Additionally, during heatwaves, naturally ventilated dwellings may still become very warm. Therefore, it is essential to establish a reasonable limit on how much warmer a dwelling can be inside compared to the outside temperature.

2. DESCRIPTION OF DEVELOPMENT

The proposed development consists of a detached residential unit

3. METHODOLOGY

3.1 CIBSE TM59

The appropriate methodology to follow for the overheating risk assessment in dwellings is CIBSE TM59 (2017) – Design methodology for the assessment of overheating risk in homes.

It is described by its authors as a technical memorandum, and has been written to standardize the approach to risk assessments.

It sets out design comfort criteria extracted from CIBSE TM52 and CIBSE Guide A, an assessment methodology and suggested reporting requirements. Key aspects include:

- Modelling should be based on a suitable sample of units;
- Building should be zoned and modelled using likely materials and build-ups;
- Standard profiles should be applied for occupancy, lighting and equipment gains;
- Operable windows should be included in the design;
- Internal and external shading should be included;
- Any mechanical ventilation should be included;
- Weather should be local Design Summer Year for the most appropriate location for 2020 high emissions 50% scenario;

- Modelling should use hourly dynamic simulation modelling.

The suggested reporting requirements include:

- Dynamic analysis software used;
- Site location and orientation;
- Images of the model and units for testing;
- Information on constructions used including thermal mass;
- Ventilation strategy modelled including details of openings and ventilation rates;
- Weather files used;
- Category of building;
- Reports of the analysis;
- Statement of whether it passes or fails.

3.2 Criteria for Naturally Ventilated Homes

For naturally ventilated homes, the compliance criteria are as follows:

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 of May to September inclusive shall not be more than 3pc of occupied hours (CIBSE TM52 criterion 1:hours of exceedance);
2. For bedrooms only: to guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10pm to 7am shall not exceed 26°C for more than 1% of annual hours.

Criteria 2 and 3 from TM52 may fail to be met, but both of the above must be passed for relevant rooms.

3.3 Criteria for Mechanically Ventilated Homes

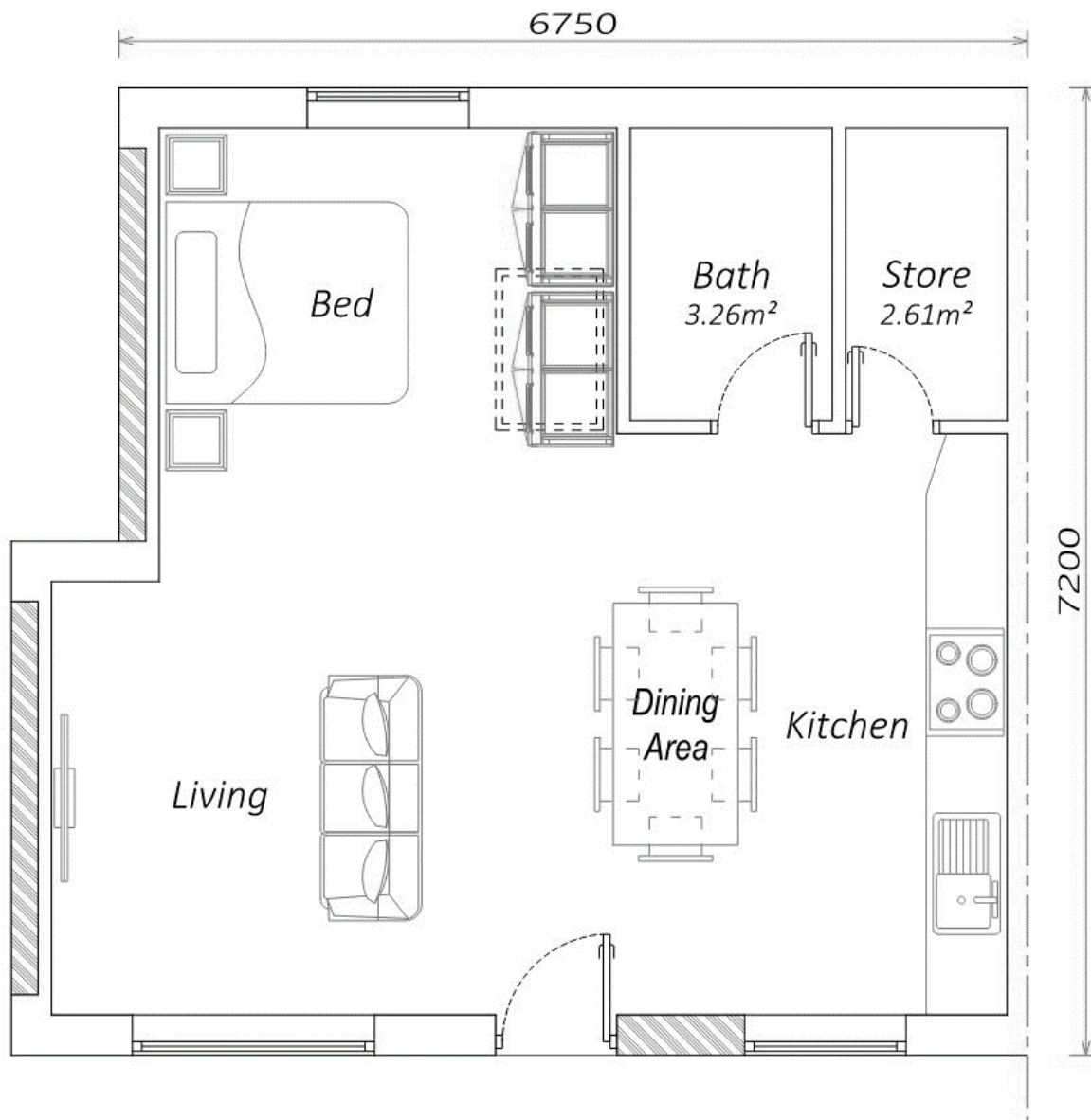
For homes with restricted openings the CIBSE fixed temperature test must be followed, ie all occupied rooms should not exceed an operative temperature of 26°C for more than 3% of annual occupied hours (CIBSE Guide A 2015). The assumed air change rate is 0.5 ACH.

4. MODELING INPUT DATA

4.1 Project Location

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4.2 Reference Architectural Design



1. Proposed Ground Floor Plan

4.3 Software used

DesignBuilder V7.3 is used for the TM 59 Dynamic simulation.

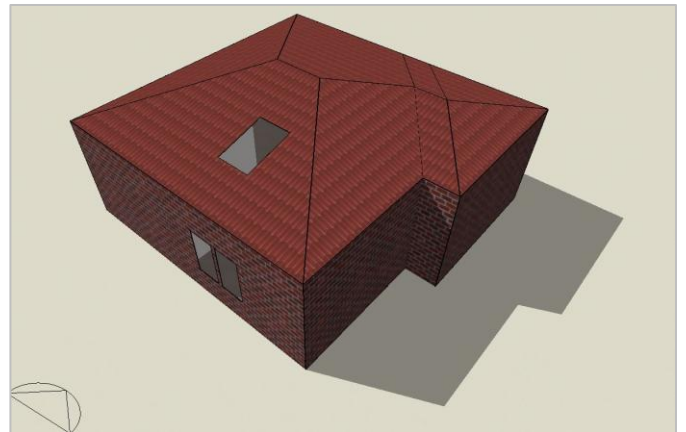
4.4 Weather Files

CIBSE Weather Data – Future Design Summer Year (DSY-1), 2050s, Medium Emissions scenario, London/Heathrow DSY weather file.

Location Template	
Template	LONDON/HEATHROW AIR
Site Location	>>
Site Details	>>
Time and Daylight Saving	>>
Simulation Weather Data	>>
Hourly weather data	2050_Heathrow_a1b_10_percentile_DSY
Day of week for start day	8-Use weather file
☒ Use weather file snow and rain indicators	
Winter Design Weather Data	>>
Summer Design Weather Data	>>

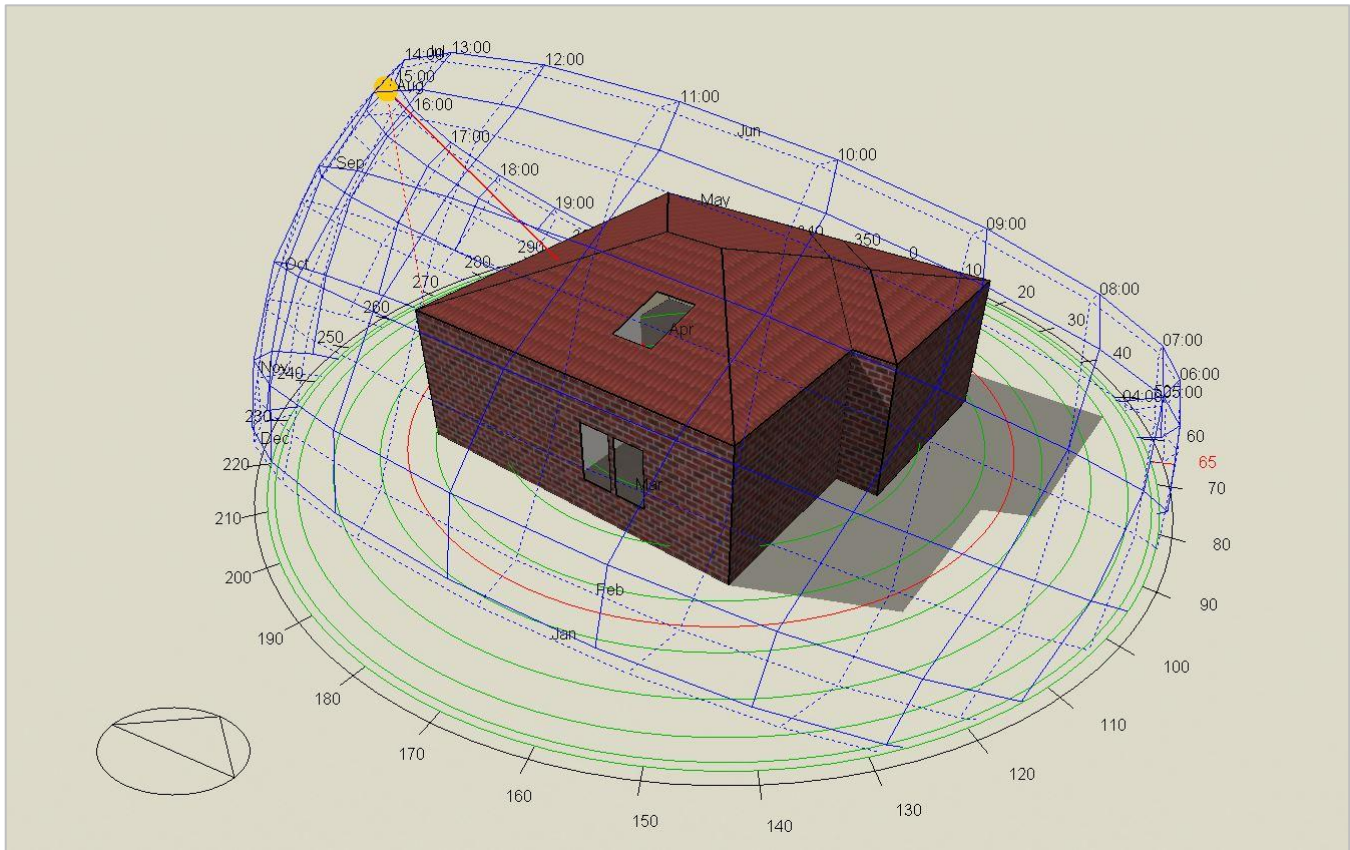
3 Weather Details

4.1 3D Model



2 DesignBuilder Model

4.2 Sun Path Diagram



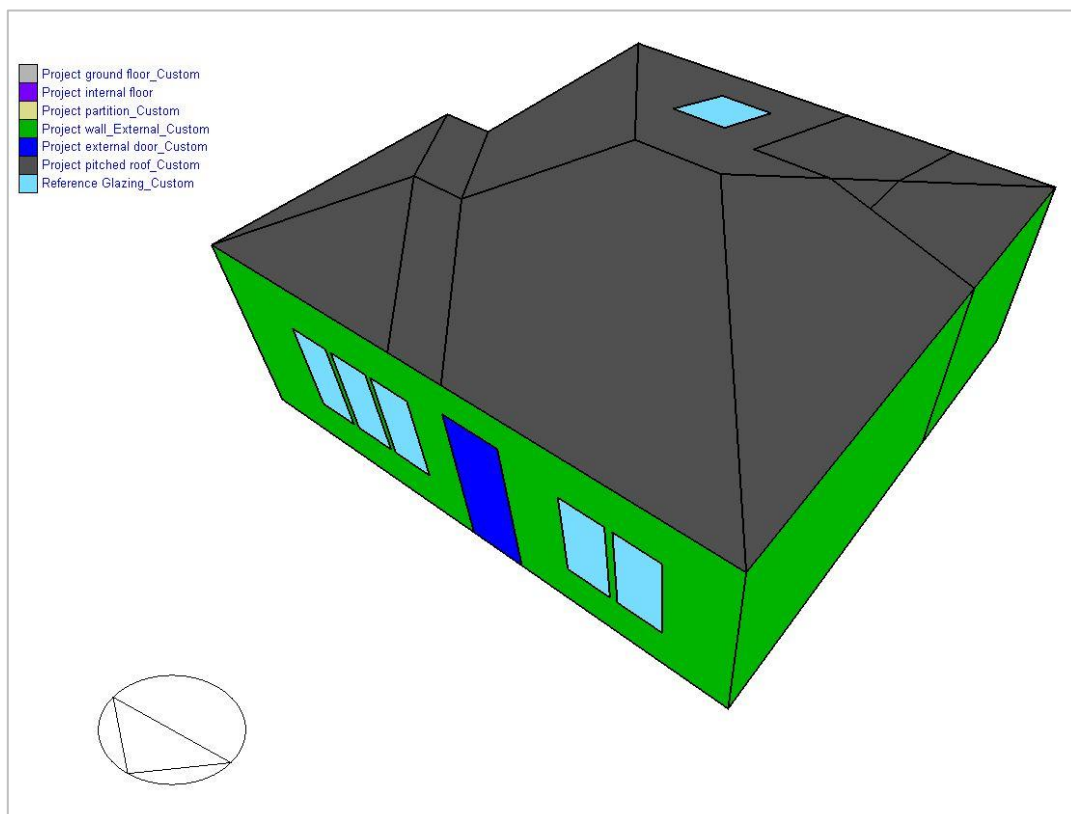
3 Sun path Diagram

4.3 Construction Data Inputs

Elements	Dwellings Design Performance: (U value)	Remark
External Wall (W/m ² .K)	0.16	Assumed
Roof (W/m ² .K)	0.09	Assumed
Floor (W/m ² .K)	0.11	Assumed
Internal Partitions (W/m ² .K)	1.87	
Doors (W/m ² .K)	1.00	Assumed

The thermal performance of glazing has been input based upon below table,

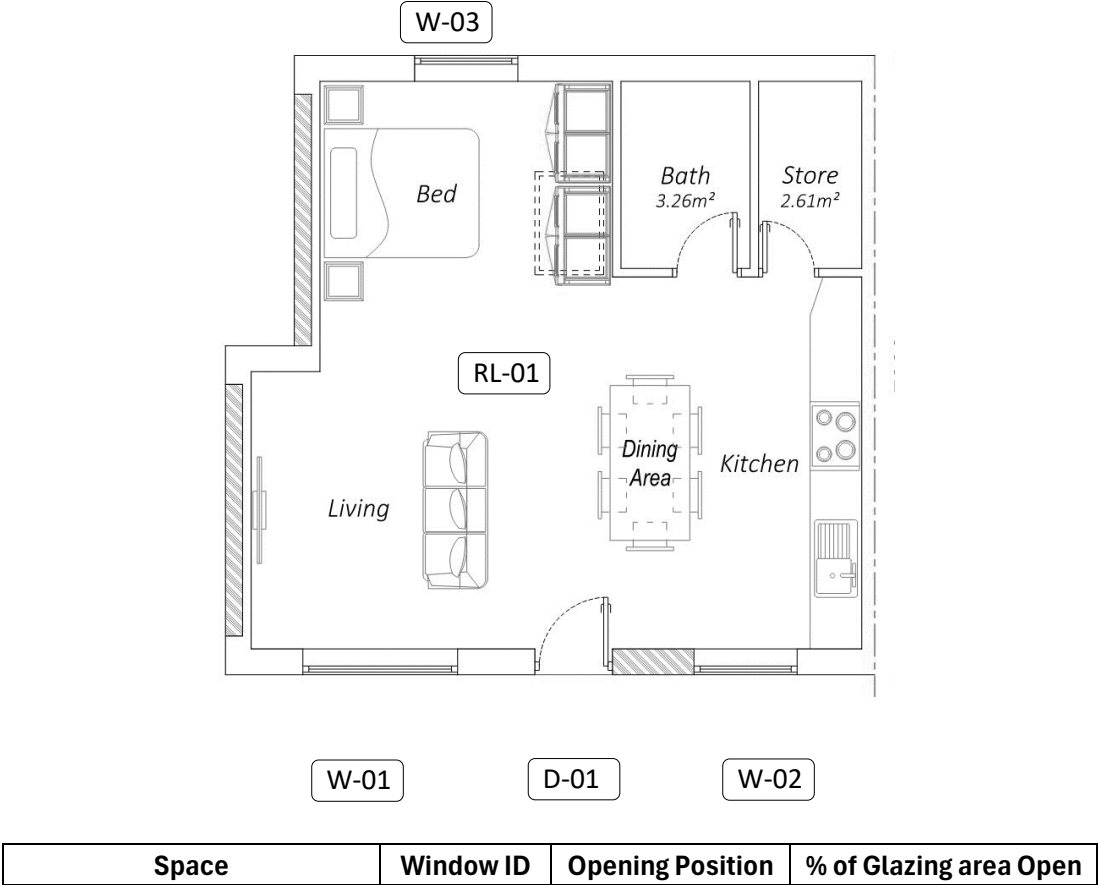
Sr No	Glazing Type	U Value (W/m ² .K)	Frame Factor	g Value	LT Value	Outside Emissivity	Inside Emissivity
1	Windows (Double Glazed)	1.20	10%	0.63	82%	0.840	0.840
2	Roof Window (Double Glazed)	1.20	10%	0.63	82%	0.840	0.840



4.4 Thermal Templates used in 3D Model



5. WINDOW PROFILE



Living Room/ Kitchen & Dining Area/ Bedroom	D-01	Side	75%
	W-01	Side	75%
	W-02	Side	75%
	W-03	Side	75%
	RL-01	Side	75%

6. TM59 SIMULATIONS RESULTS

Criterion 1: For living rooms, kitchens and bedrooms: the number of hours during which ΔT 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.

Criterion 2 : [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).

Daily Monthly RunPeriod CIBSE TM59 Summary Summary Charts				
CIBSE TM59				Export CSV
Naturally ventilated				
Criteria for predominantly naturally ventilated homes				
Block	Zone	Criterion A (%)	Criterion B (hrs)	Pass/Fail
BdmXLvngXRchnXDng	BdmXLvngXRchnXDng	0.00	0.00	Pass

6 Simulation Results

		Criterion 1 (% Hrs Top-Tmax >=1K) (Limit = 3%)	Criterion 2 (Hours > 26°C Operative Temperature from 10pm to 7 am) (Limit =33 hrs)
Ground Floor	Living Room/ Kitchen & Dining Area/ Bedroom	Pass	Pass

7. CONCLUSION

This assessment demonstrates that the proposed development at Aldeburgh can maintain suitable indoor temperatures during summer, meeting CIBSE TM59 thermal comfort standards. Using DesignBuilder 7.3 software, we conducted dynamic thermal modelling in line with the CIBSE TM59: 2017 guidelines for evaluating overheating risks in homes.

The study evaluates the potential for overheating in residential units. The analysis, based on Norwich_DSY1 weather data, confirms that the proposed development adheres to CIBSE TM59 criteria and is not susceptible to overheating during the summer.