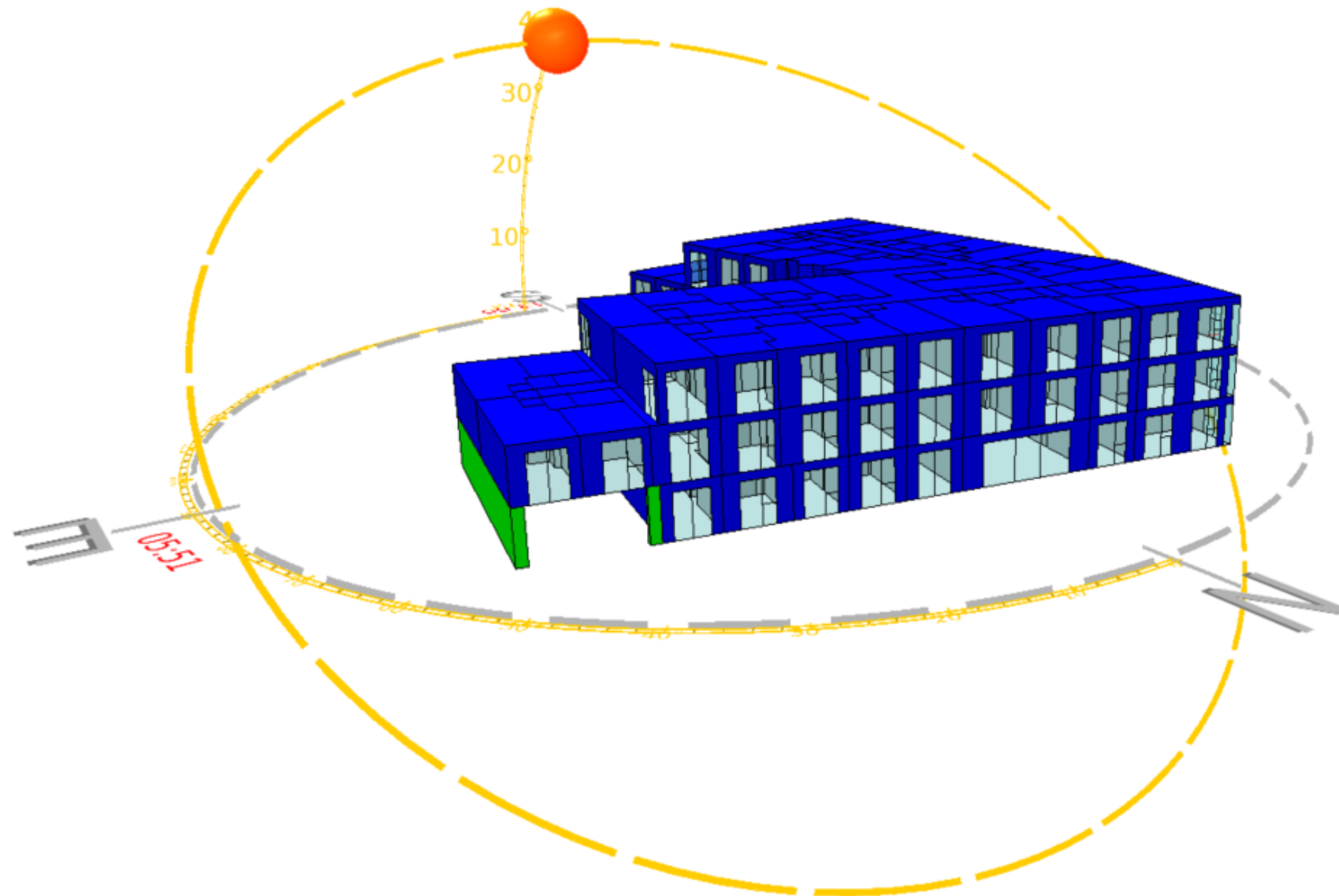


Gladeside Court

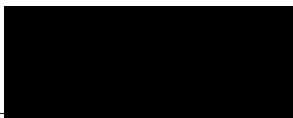
Greenwood Road Wythenshawe
CIBSE TM59 Overheating Analysis



OVERHEATING REPORT OF GLADESIDE ROAD

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Prepared by:	Signature	Date
Ben Dibb-Fuller		02.11.23

Revision Record			
Rev	Date	By	Summary of Changes
01	02.11.23	BDF	



1 EXECUTIVE SUMMARY

This report documents the overheating analysis of the proposed Gladeside Court residential site on Greenwood Road, Wythenshawe. The site consists of a three of apartment block, ranging between 1 and 2-bed units – totalling 40 apartments in total. This overheating assessment analyses all 40 units across the development to assess the overheating risk posed to each with the proposed ventilation strategy.

The proposed design includes a combination of opening windows and mechanical ventilation (MVHR, based on the Lo-Carbon Sentinel Kinetic BH Unit) to mitigate summertime temperatures during periods of increased temperatures. All opening windows (where applicable – as detailed in this report) have been assumed to be unrestricted whereby the openings can be opened to >25° opening angles (windows only, patio/balcony doors have been assumed to be fully openable). All windows/balcony doors have been modelled to be opened when required during the day and night-time, with the exception of ground floor spaces which for security reasons have been modelled as closed overnight. As the results show, the ability to leave window/balcony doors open overnight to allow as much purging as possible of the built-up warm air from the apartments has a substantial effect on reducing internal temperatures during summer months due to the flow rates achieved by the large opening areas.

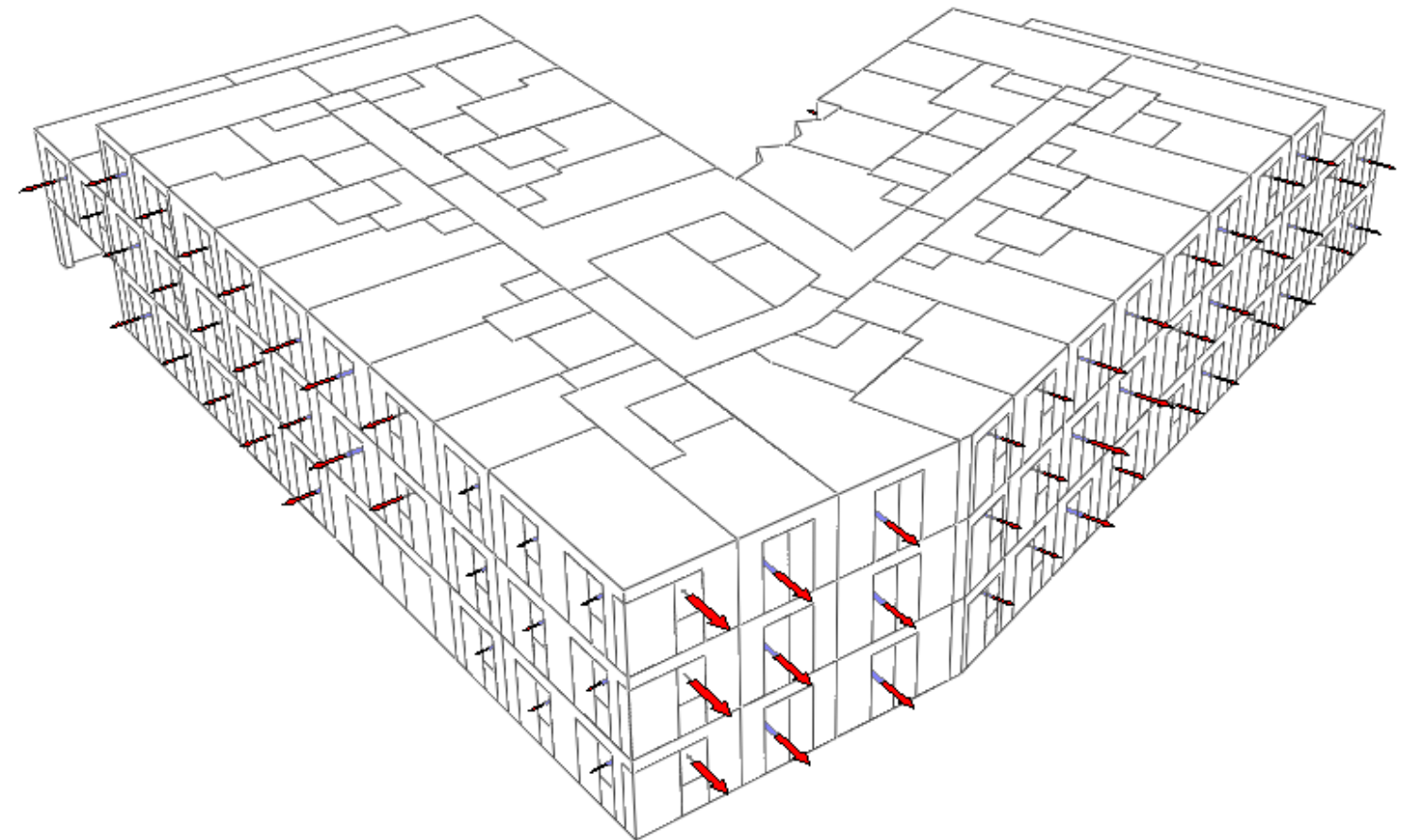
The MVHR units, based on the aforementioned Lo-Carbon Sentinel Kinetic BH, are required to deliver boost rates (flow rates are detailed within this report) beyond the minimum Approved Document F in order to achieve compliance with the overheating criteria, whereas apartments to the first and second floors do not require such boost rates and are compliant with the minimum required.

In addition to the above, a glazing solar performance factors (g Value) of between 63% (specified in report) have been considered to prevent excessive solar gains, alongside user controlled internal blinds on all glazing which can be demonstrated to not impact the natural ventilation through window openings.

This assessment found that all spaces were able to gain compliance with the TM59 overheating criteria and are able to overcome summertime temperatures through the described strategies, provided the MVHR flow rates are met and the external openings are used and opened as described in this report.

As per TM59, the inclusion of corridors in the overheating analysis is mandatory where community heating pipework runs through them – which has been assumed to be the case. Although there is no mandatory target to meet, should the assessed corridors exceed 28°C for more than 3% of the year then it should be highlighted as an overheating risk. However it was found the corridors do not pose an overheating risk to this development.

A summary of the results from this assessment can be found below.





Floor	Space Type	Mechanical Ventilation Type	Current Overheating Strategy	Number of Spaces	Number of Spaces Failing	TM59 Compliance	Notes	Detailed Results
Ground	Bedrooms	MVHR	<ul style="list-style-type: none">Unrestricted opening windows (circa >25° opening angles)Ground Floor windows/patio doors closed overnightFirst and second floor window/patio doors can be opened overnightFully openable patio/balcony doors (where applicable)MVHR with supply rates as described in this reportGlazing g value of 0.63User controlled blinds designed to not interfere with the natural ventilation through window/door openings are required for compliance.	17	0		-	See Appendix
	Living			12	0			
First	Bedrooms			21	0		-	
	Living			16	0			
Second	Bedrooms			17	0		-	
	Living			12	0			

All corridors were found to not exceed the 3% of hours over 28°C threshold across the year.



2 INTRODUCTION

The proposed Gladeside Court development will see 40 new apartments developed on the land between Greenwood Road and Gladeside Road, Wythenshawe. The scheme will comprise 25 one-bedroom and 15 two-bedroom apartments across the three-storey block, with associated car parking spaces and cycle storage for residents.

This report focuses on the apartments to the ground, first and second floors the proposed apartment block, whereby habitable spaces within these apartments are assessed against CIBSE TM59 overheating assessment to determine whether the currently proposed overheating mitigation strategy enables them to comply with the overheating criteria.

Natural ventilation by unrestricted opening windows forms the main part of the ventilation strategy, whereas mechanical ventilation in the form of MVHR are present in all described apartments. It may be necessary for the MVHR unit to employ a boost mode to accelerate the extraction of warm, stale air out of the apartments and supply / drive fresh air into habitable spaces via the window openings.

Glazing g value of 0.63 has been modelled to help control solar gains, in addition to internal user controlled blinds – which have been assumed to not interfere with the opening areas of the windows.

The analyses are to be carried out using IES Virtual Environment 2022 compliance version 2.0.0 and in line with CIBSE AM11 Building energy and environmental modelling.

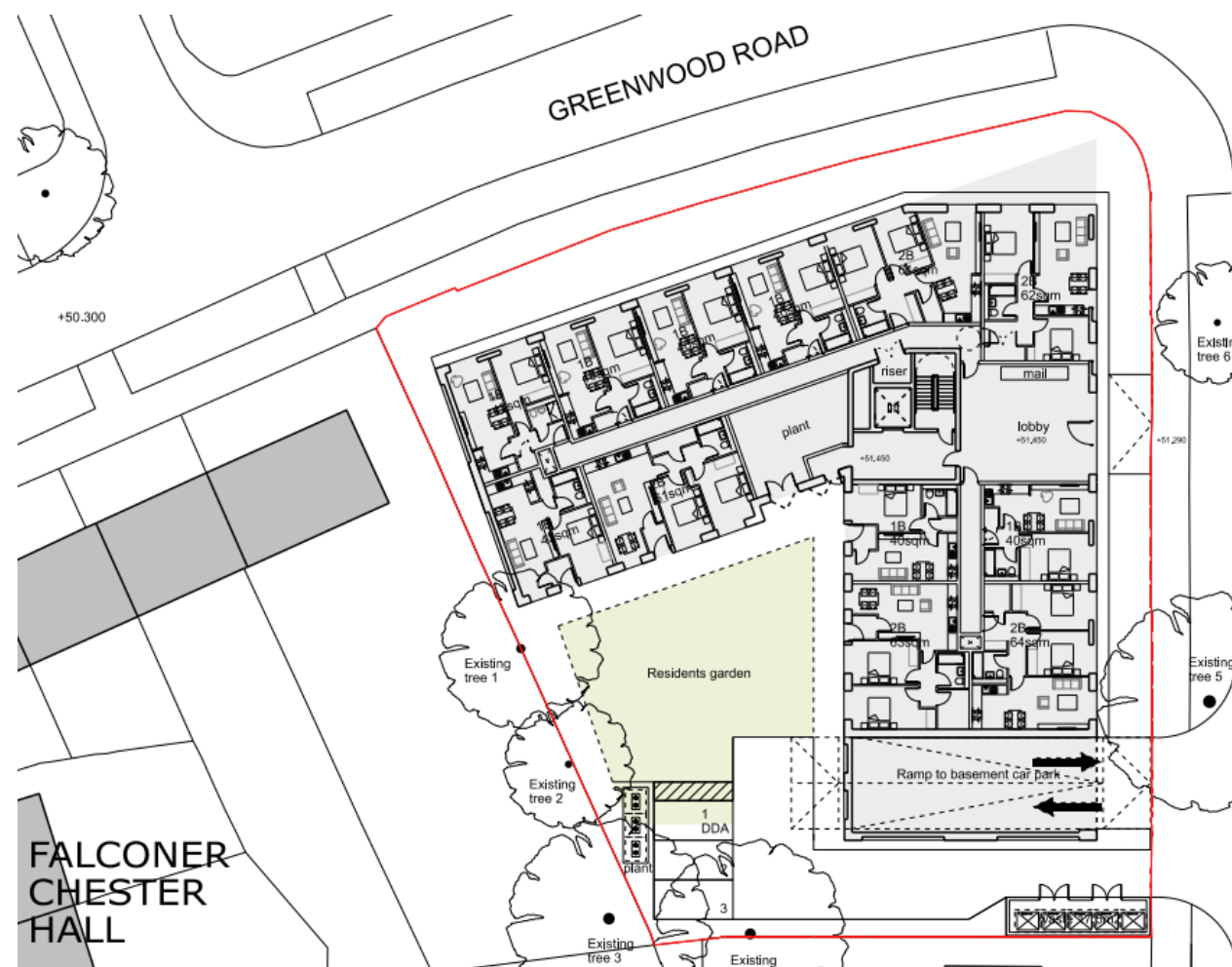


Figure 1: Site Location (left) and CGI of Proposed Development (right)

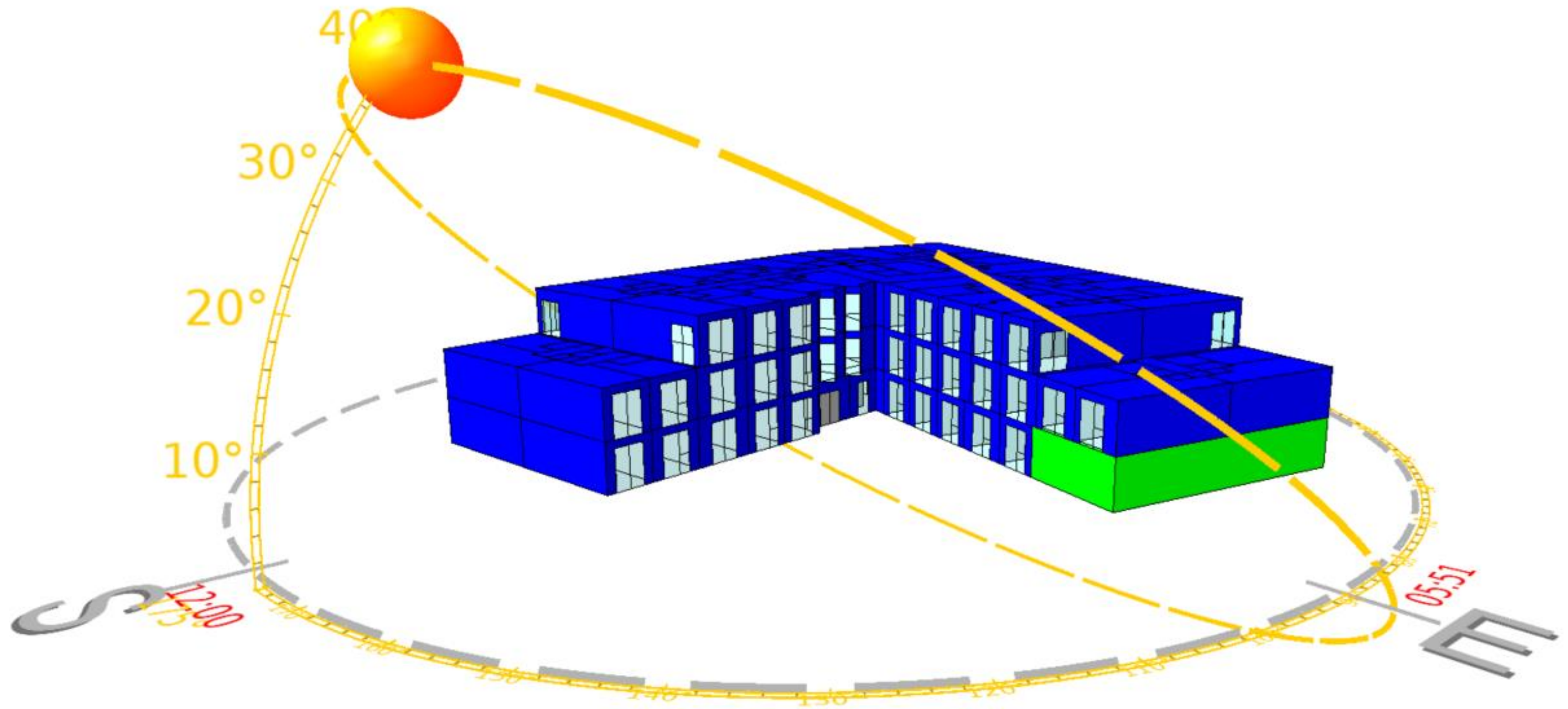


Figure 2: IES Model of proposed development



3 DESIGN PRINCIPLES

TM59 sets different overheating compliance criteria for homes that are predominantly naturally ventilated and for homes that are predominantly mechanically ventilated.

For homes that are predominantly naturally ventilated, the method with two criteria should be used to assess overheating. The first overheating criteria, which applies to both living rooms/kitchens and bedrooms, is an adaptive criteria. The second overheating criterion is a fixed temperature criteria which applies only to bedrooms. Both criteria must be met for all spaces within a home to demonstrate compliance.

For mechanically ventilated homes, the fixed temperature method with a single criterion should be used to assess overheating. This single criterion must be met for all spaces (living rooms/kitchens and bedrooms) within a mechanically ventilated home to demonstrate compliance.

The TM59 criteria for naturally and mechanically ventilated homes are summarised in the following table. The dwellings in this assessment are assessed against 'predominantly naturally ventilated' criteria.

All criteria must be met for all spaces within a home to demonstrate full compliance.

Assessment Type	Assessment Criteria	Applicable Rooms	Occupied Hours	Naturally Ventilated Homes (open windows)	Mechanically Ventilated Homes (closed windows)
Predominantly Natural Ventilation	Criterion 1	Living rooms, kitchens and bedrooms	Living / Kitchen / Dining rooms – 9am to 10pm (13 hours/day) Bedrooms – 24-hour occupancy	The number of hours during which external and internal temperature difference is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3% of occupied hours.	Not Applicable
	Criterion 2	Bedrooms only	Bedrooms – 24-hour occupancy	The operative temperature in the bedroom from 10 pm to 7 am shall not exceed 26 °C for more than 1% of annual hours. 33 or more hours above 26°C will be a fail	Not Applicable
Predominantly Mechanical Ventilation	Criterion 3	Living rooms, kitchens and bedrooms	Living / Kitchen / Dining rooms – 9am to 10pm (13 hours/day) Bedrooms – 24-hour occupancy	Not applicable	The operative temperature in occupied all occupied rooms should not exceed 26°C for more than 3% of the annual occupied annual hours. 143 or more hours above 26°C for living rooms and kitchens will be a fail. 263 or more hours above 26 °C for bedrooms will be a fail



4 DESIGN CRITERIA

The following general criteria have been used throughout the simulation:-

4.1 AIR PERMEABILITY

An air infiltration rate of 0.25ACH has been applied to the apartments based on Table 4.24 of CIBSE Guide A.

4.2 EXTERNAL ENVELOPE

The following U-values have been used:-

Element	Proposed U-value (W/m ² K)	Part L2A U-value (W/m ² K) (2013)
External Walls	0.24	0.35
Exposed floor	0.15	0.25
Roof	0.15	0.25
Glazing	1.40	2.20

Building envelope U-values

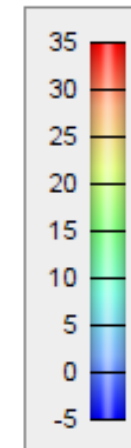
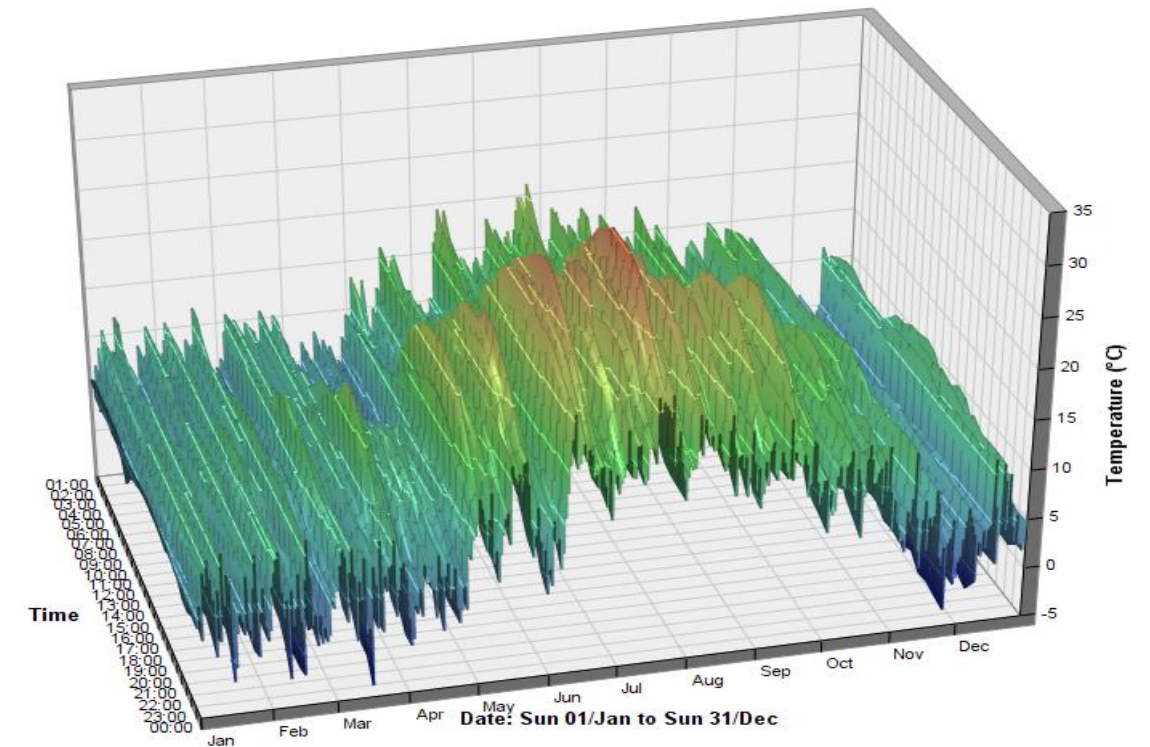


Figure 3: Weather file annual dry bulb temperature

4.3 GLAZING SPECIFICATION

The glazing across the site is based on the following G-values:

G Value = 63%

4.4 INTERNAL WINDOW BLINDS

Internal blinds have been included in the calculations, based on shading coefficient and short-wave radiant fractions of 0.4 and 0.3 respectively. As TM59 states, blinds can only be modelled if it can be proven that the design does not restrict or reduce natural ventilation through the window openings. Careful consideration should be taken when selecting blinds which fit design.

4.5 WEATHER

The building is to be located in Wythenshawe, which can be geographically represented using weather file:- **Manchester_DSY1_2020High50.epw**. The peak summer temperature is 30.0°C.

4.6 SITE & ORIENTATION

The building has been modelled in the orientation represented in figure 4.

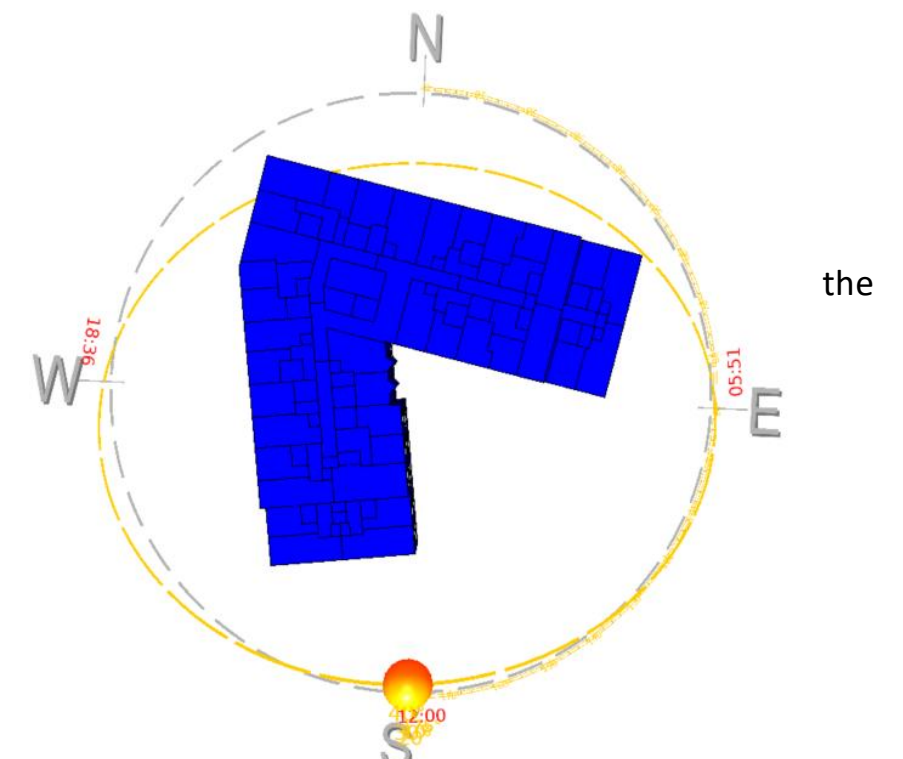


Figure 4: Building orientation



5 INTERNAL GAINS

The internal gains used throughout the simulations are detailed below. No differences between weekdays and weekends are considered. Bedrooms are set with a 24 hour occupancy profile which means that one person is always considered in each bedroom during the daytime and two people in each double bedroom at night. Kitchen/living rooms are unoccupied during sleeping hours and occupied during the rest of the day. Occupied periods are totalled as 3672 hours per year for bedrooms (24/7 May to September) and 1989 hours for living areas (13 hours per day May to September).

5.1 OCCUPANCY

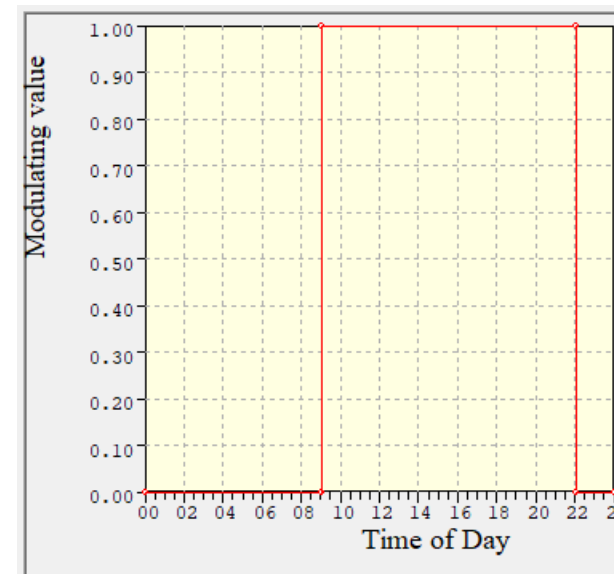
Based on CIBSE Guide A (2015a), a maximum sensible heat gain of 75W/person is assumed in the living spaces. An allowance for 30% reduced gain during sleeping is based on Addendum g to ANSI/ASHRAE Standard 55-2010.

Activity	Sensible heat gain per person (W)
Standard	75
Sleeping	52.5

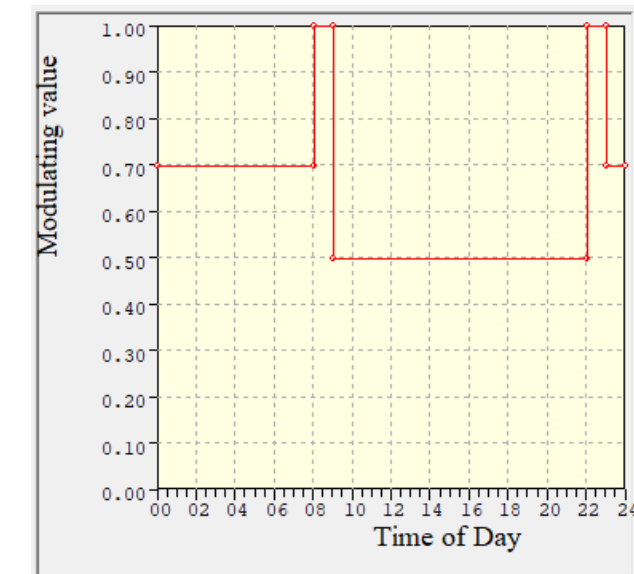
Occupant Gains

Unit/room type	Occupancy
1 bed living/kitchen	1 person from 9am to 10pm room is unoccupied for the rest of the day
2 bed living/kitchen	2 people from 9am to 10pm room is unoccupied for the rest of the day
3 bed living/kitchen	3 people from 9am to 10pm room is unoccupied for the rest of the day
Double bedroom	2 people at 70% gain from 11pm to 8am 2 people at full gain from 8am to 9am and from 10pm to 11pm 1 person at full gain from 9am to 10pm
Single bedroom	1 person at 70% gain from 11pm to 8am 1 person at full gain from 8am to 11pm
Communal corridors	Assumed to be zero

Occupancy



Typical living/kitchen occupancy profile



Typical double bedroom occupancy profile



5.2 LIGHTING

Lighting energy is assumed to be proportional to floor area. A default value of 2W/m² is applied to all occupied areas from 6pm to 11 pm.

Zone Type	Gain (W/m ²)
living/kitchen/dining areas, bedrooms	2
	0

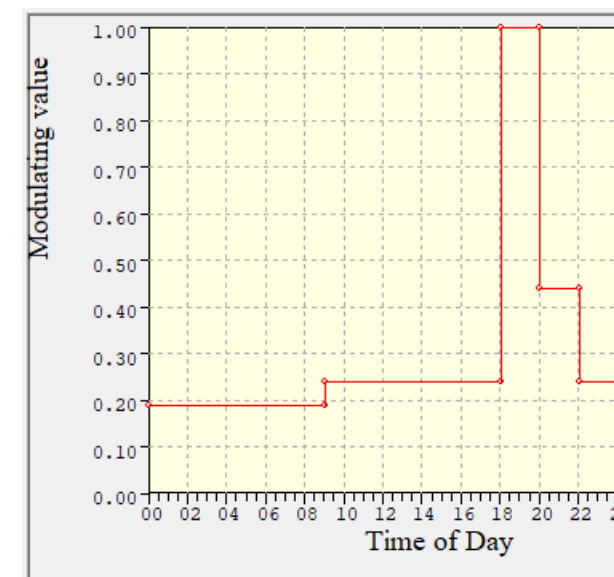
Lighting gains

5.3 EQUIPMENT

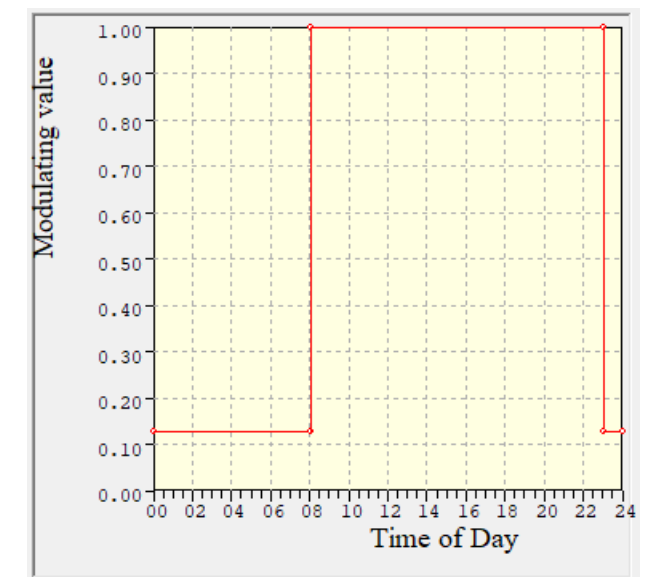
Equipment gains per room type are listed in the table below.

Unit/room type	Load
1 bed living/kitchen	Peak load of 450W from 6pm to 8pm 200W from 8pm to 10pm 110W from 9am to 6pm and 10pm to 12pm Base load of 85W for the rest of the day
2 bed living/kitchen	Peak load of 450W from 6pm to 8pm 200W from 8pm to 10pm 110W from 9am to 6pm and 10pm to 12pm Base load of 85W for the rest of the day
3 bed living/kitchen	Peak load of 450W from 6pm to 8pm 200W from 8pm to 10pm 110W from 9am to 6pm and 10pm to 12pm Base load of 85W for the rest of the day
Double bedroom	Peak load of 80W from 8am to 11pm Base load of 10W during sleeping hours
Single bedroom	Peak load of 80W from 8am to 11pm Base load of 10W during sleeping hours

Equipment gains



Typical living/kitchen equipment profile



Typical double bedroom equipment profile

5.4 COMMUNAL CORRIDORS

Communal corridors are assumed to have community heating pipework running through them. A mid-range estimate gain of 8W/m run of pipe as per *Table 1 Default heat losses from pipework (HMG, 2013; Table 5)* from CIBSE TM59 has been assumed.



6 VENTILATION

6.1 NATURAL VENTILATION

The windows have been modelled using an opening profile that simulates the occupants within the rooms opening the windows when the internal air temperature reaches 21°C. The same procedure operates in reverse as the air temperature cools.

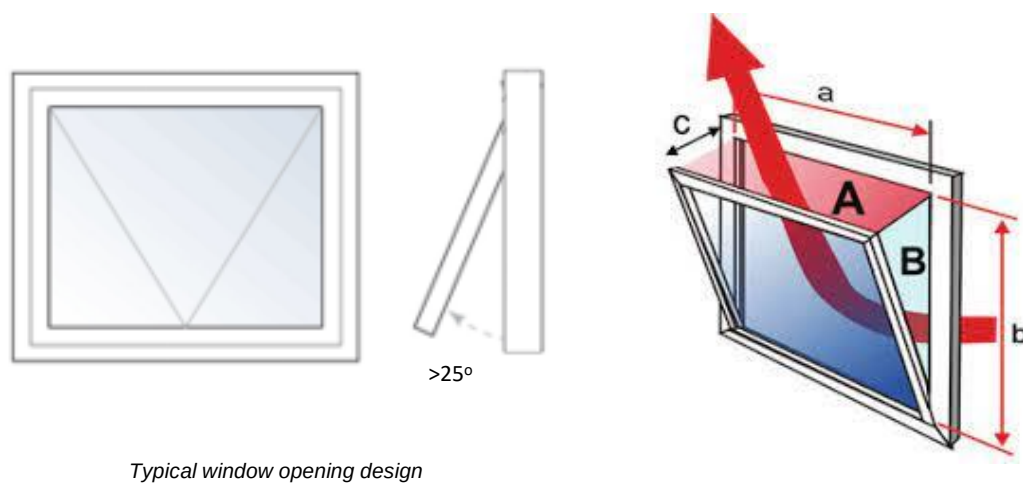
The free area is a way of measuring what the equivalent completely open area is for a glazing assembly. Sufficient free area to the opening windows in a dwelling is vital to the overheating mitigation strategy and can be calculated using the combined areas of A+B (in m²).

Opening angle is the degree of opening of area **B**. Windows have been modelled to be either top or side hung as shown on the architectural drawings.

Opening Schedule Description:

- **External Window Closed:** Fixed pane, unopenable
- **Top Hung Night Closed:** >25° opening angle, closed overnight
- **Patio Doors Night Closed:** 90° opening angle, closed overnight
- **Patio Doors Night Open:** 90° opening angle, no closing restriction

See below for window opening schedules.



Typical window opening design

Figure 5: Typical window opening types across the development

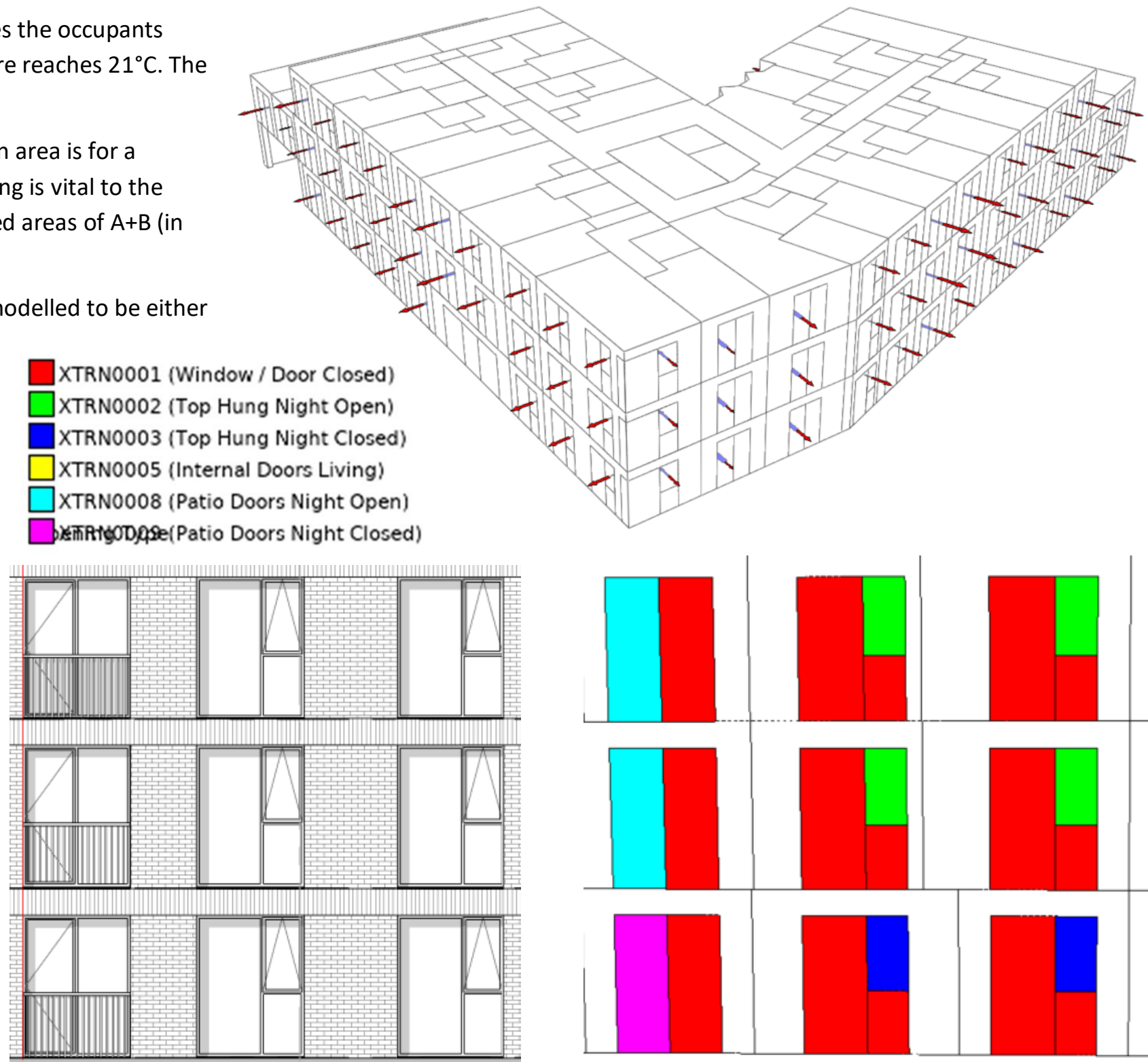


Figure 6: Typical elevations across the development - Architectural drawing (left) and IES model (right) & macroflo image of dynamic thermal model illustrating airflow arrows of natural ventilation strategy (top)



6.2 WINDOW OPENING SCHEDULE

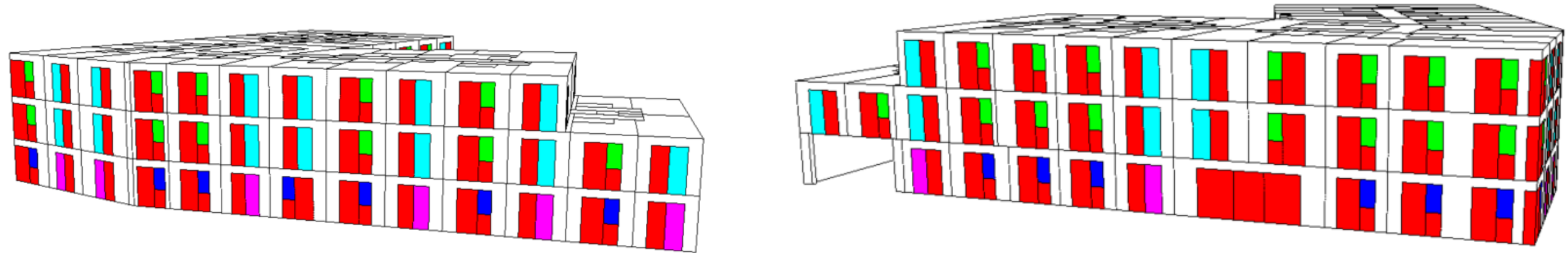


Figure 7: Window Opening Schedule North and West Elevations

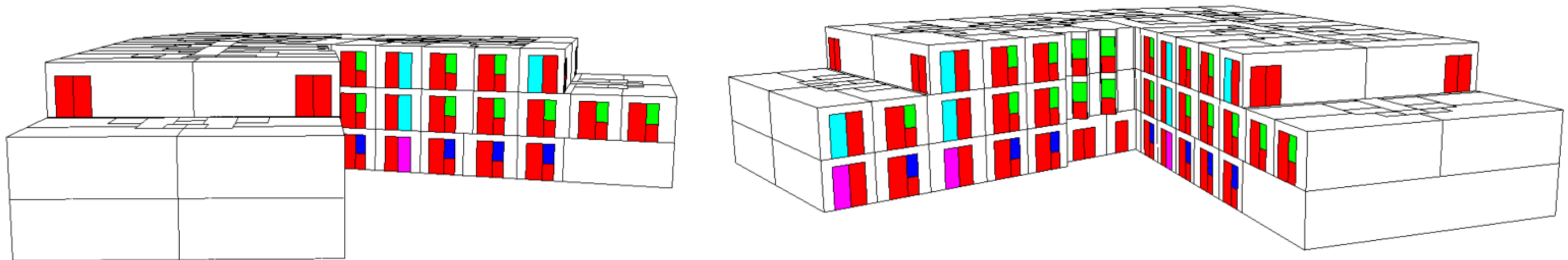


Figure 8: Window Opening Schedule South and East Elevations (courtyard)

- XTRN0001 (Window / Door Closed)
- XTRN0002 (Top Hung Night Open)
- XTRN0003 (Top Hung Night Closed)
- XTRN0005 (Internal Doors Living)
- XTRN0008 (Patio Doors Night Open)
- XTRN0009 (Patio Doors Night Closed)



6.3 MECHANICAL VENTILATION

6.3.1 MVHR - Lo-Carbon Sentinel Kinetic BH

Mechanical ventilation in the form of MVHR is proposed for the dwelling, known as a system 4 ventilation system.

This is a low energy, continuous mechanical ventilation system designed to replace conventional extract ventilation systems (such as intermittent systems) by drawing moisture laden air out of the kitchen and wet rooms (bathrooms and utility) while supplying fresh air to habitable rooms such as Bedrooms and Living spaces.

An additional benefit is an air pathway is also formed drawing warm air out of habitable spaces and evacuated from the dwelling, with the makeup air being provided by mechanically supplied air from the unit in addition to any windows in habitable spaces (when opened).

The minimum whole house ventilation rates can be seen in table 1.3 – these have been taken from *Approved Document F*.

For more information, please refer to *Approved Document F, Volume 1: Dwellings*.

The following required supply rates for TM59 compliance in habitable rooms are as follows:

- Ground Floor Bedrooms: 6l/s (boosted to 20l/s)
- First/Second Floor Bedrooms: 6l/s (no boost required)
- Ground Floor Living/Kitchen: 13l/s (boosted to 15/s)
- Ground Floor Living/Kitchen: 13l/s (no boost required)

Boost mode has been modelled to operate when internal temperatures exceed 22°C.

Table 1.3 Minimum whole dwelling ventilation rates by no. of bedrooms	
Number of bedrooms ⁽¹⁾⁽²⁾	Minimum ventilation rate by no. of bedrooms (l/s)
1	19
2	25
3	31
4	37
5	43
NOTES:	
1. If the dwelling only has one habitable room, a minimum ventilation rate of 13l/s should be used.	
2. For each additional bedroom add 6l/s to the values in Table 1.3	

▲ Total Combined rate of continuous ventilation in the dwelling needs to meet the above minimum rates.

Figure 10: Minimum required ventilation rates from Approved Document F

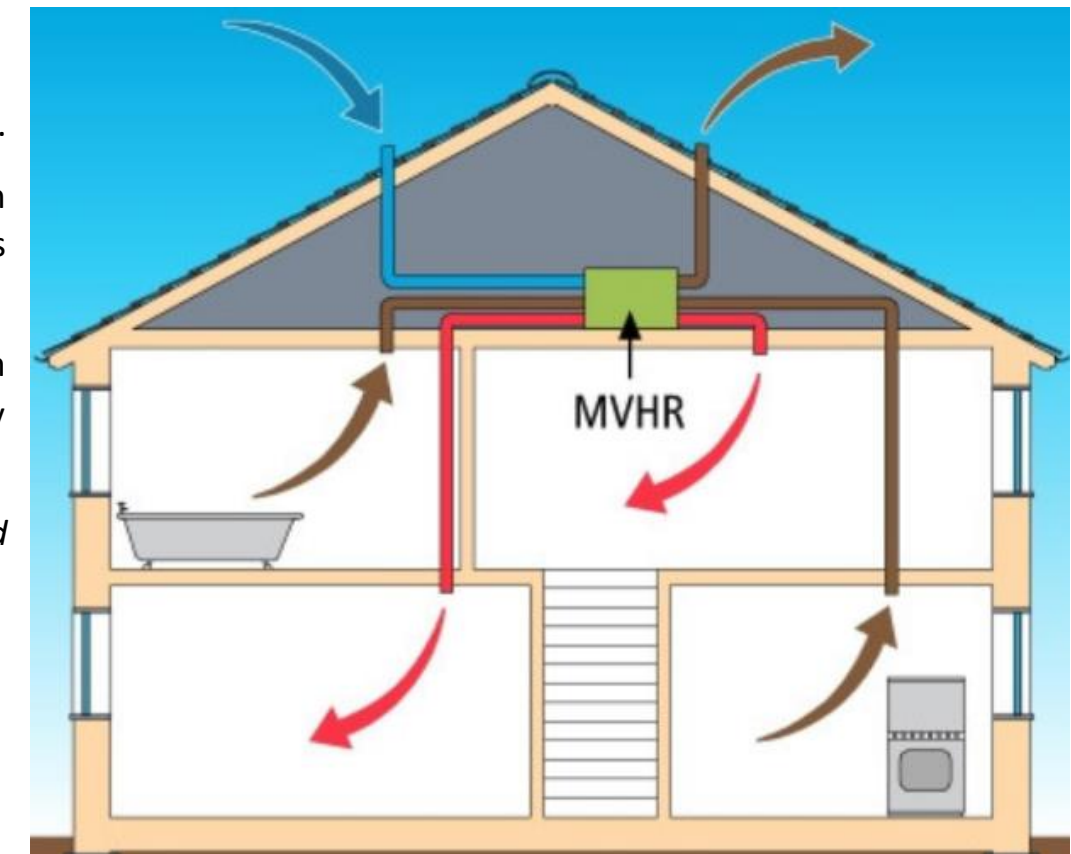


Figure 9: Depiction of MVHR ventilation system



7 ENSURING THE OVERHEATING STRATEGY IS USABLE

There are a number of measures to ensure the overheating mitigation strategy can be feasibly implemented in reality, as well as complying with overlapping building codes. A summary of these standards has been compiled below:

7.1 NOISE

- **3.2)** In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).
- **3.3)** Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits: A) 40dB LAeq,T, averaged over 8 hours (between 11pm and 7am). & b) 55dB LAFmax, more than 10 times a night (between 11pm and 7am).

7.2 POLLUTION

- **3.5)** Buildings located near to significant local pollution sources should be designed to minimise the intake of external air pollutants. Guidance is given in Section 2 of Approved Document F, Volume 1: Dwellings.

7.3 SECURITY

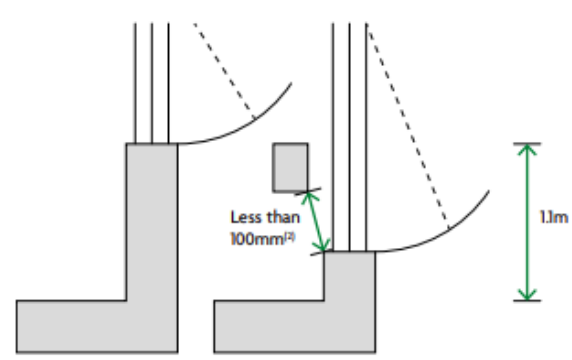
- **3.6)** When determining the free area available for ventilation during sleeping hours, only the proportion of openings that can be opened securely should be considered to provide useful ventilation. This particularly applies in the following locations, where openings may be vulnerable to intrusion by a casual or opportunistic burglar.
 - a) Ground floor bedrooms
 - b) Easily accessible bedrooms

7.4 PROTECTION FROM FALLING

- **3.8)** Openings which are intended to be open for long periods to reduce overheating risk might pose a higher risk of falls from height. Only the proportion of openings which can be opened with a very low risk of occupants falling from height should be considered to form part of the overheating mitigation strategy.
- **3.9)** Openings that can be opened wider than 100mm may form part of the overheating mitigation strategy where they meet all of the following conditions:
 - a) Window handles on windows that open outwards are not more than 650mm from the inside face of the wall when the window is at its maximum openable angle.
 - b) Guarding meets the minimum standards in Table 3.1
 - c) Guarding does not allow children to easily climb it. For example, horizontal bars should generally be avoided.

For more information, please refer to *Approved Document K*.

Table 3.1 Guarding heights	
Change in floor level between inside and outside	Guarding height ⁽¹⁾
Less than 600mm	See Approved Document K
More than 600mm	1.1m



NOTES:

1. This approved document has increased levels of protection from falling compared to Approved Document K. Where applicable, the higher standard applies.
2. Guarding should be sized to prevent the passage of a 100mm sphere.

Figure 11: Minimum required ventilation rates from Approved Document F



8 RESULTS SUMMARY

A full set of results can be found in the attached appendix A.

The Summary tab table an overview which combines both the results of Criterion A & B.

To achieve a pass under Criterion A the column labelled “% Occupied hours $\Delta T \geq 1^\circ\text{K}$ ” should not be more than 3% for both living spaces and bedrooms. In addition, the bedrooms should not exceed a value of 32 under Criterion B for the column labelled “Total hours $> 26^\circ\text{C}$ ” which represents 1% of the total occupied hours.

Results Summary

Floor	Space Type	Mechanical Ventilation Type	Current Overheating Strategy	Number of Spaces	Number of Spaces Failing	TM59 Compliance	Notes	Detailed Results
Ground	Bedrooms	MVHR	<ul style="list-style-type: none">Unrestricted opening windows (circa >25° opening angles)Ground Floor windows/patio doors closed overnightFirst and second floor window/patio doors can be opened overnightFully openable patio/balcony doors (where applicable)MVHR with supply rates as described in this reportGlazing g value of 0.63User controlled blinds designed to not interfere with the natural ventilation through window/door openings are required for compliance.	17	0		-	See Appendix
	Living			12	0			
First	Bedrooms			21	0		-	
	Living			16	0			
Second	Bedrooms			17	0		-	
	Living			12	0			

All corridors were found to not exceed the 3% of hours over 28°C threshold across the year.



9 APPENDIX

9.1 APPENDIX A – CIBSE TM59 OVERHEATING RESULTS

9.1.1 Bedrooms

Location	Ventilation Strategy	Criteria (a)		Criteria (b)	TM59 Result	Predicted Peak Summer Temperature (°C)
		Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria (a) Status	Criteria (b) % of time room is above threshold temperature		
G.01 Bedroom	Nat Vent + MVHR + Blinds + g value 0.63	0.4%	PASS	20	PASS	29.4
G.02 Bedroom 1		0.3%	PASS	22	PASS	29.2
G.02 Bedroom 2		0.2%	PASS	21	PASS	29.1
G.03 Bedroom 1		1.0%	PASS	32	PASS	30.3
G.03 Bedroom 2		1.0%	PASS	32	PASS	30.2
G.04 Bedroom		0.4%	PASS	22	PASS	29.4
G.05 Bedroom 1		0.7%	PASS	23	PASS	29.7
G.05 Bedroom 2		0.2%	PASS	20	PASS	29.2
G.06 Bedroom		0.0%	PASS	14	PASS	28.9
G.07 Bedroom		1.3%	PASS	24	PASS	31.1
G.08 Bedroom		1.9%	PASS	32	PASS	31.3
G.08 Bedroom		1.8%	PASS	32	PASS	31.3
G.10 Bedroom		2.0%	PASS	30	PASS	31.5
G.11 Bedroom 1		1.5%	PASS	25	PASS	31.3
G.11 Bedroom 2		1.9%	PASS	27	PASS	31.8
G.12 Bedroom 1		0.5%	PASS	8	PASS	30.1
G.12 Bedroom 2		0.4%	PASS	20	PASS	29.8
1.01 Bedroom		0.0%	PASS	4	PASS	27.88
1.02 Bedroom 1		0.5%	PASS	14	PASS	29.59
1.02 Bedroom 2		0.2%	PASS	12	PASS	29.2
1.03 Bedroom		0.0%	PASS	9	PASS	28.51



Location	Ventilation Strategy	Criteria (a)		Criteria (b)	TM59 Result	Predicted Peak Summer Temperature (°C)
		Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria (a) Status	Criteria (b) % of time room is above threshold temperature		
1.04 Bedroom		1.1%	PASS	14	PASS	27.9
1.05 Bedroom		1.6%	PASS	18	PASS	29.6
1.06 Bedroom		1.6%	PASS	18	PASS	29.2
1.07 Bedroom		0.7%	PASS	2	PASS	28.5
1.08 Bedroom 1		1.3%	PASS	11	PASS	30.9
1.08 Bedroom 2		1.8%	PASS	11	PASS	31.2
1.09 Bedroom 1		0.5%	PASS	0	PASS	31.3
1.09 Bedroom 2		0.3%	PASS	2	PASS	30.6
1.10 Bedroom		0.7%	PASS	33	PASS	31.3
1.11 Bedroom		0.0%	PASS	13	PASS	31.7
1.12 Bedroom 1		0.0%	PASS	11	PASS	30.1
1.12 Bedroom 2		0.2%	PASS	13	PASS	29.5
1.13 Bedroom		0.0%	PASS	7	PASS	29.9
1.14 Bedroom		0.4%	PASS	11	PASS	29.1
1.15 Bedroom		0.4%	PASS	1	PASS	29.0
1.16 Bedroom 1		0.8%	PASS	16	PASS	29.3
1.16 Bedroom 2		1.2%	PASS	15	PASS	28.4
2.01 Bedroom		0.0%	PASS	5	PASS	28.1
2.02 Bedroom 1		0.4%	PASS	13	PASS	29.5
2.02 Bedroom 2		0.0%	PASS	12	PASS	29.1
2.03 Bedroom		1.4%	PASS	16	PASS	31.1
2.04 Bedroom		1.5%	PASS	16	PASS	31.1
2.05 Bedroom		0.6%	PASS	2	PASS	30.4
2.06 Bedroom 1		1.1%	PASS	10	PASS	31.1
2.06 Bedroom 2		1.6%	PASS	10	PASS	31.6
2.07 Bedroom 1		0.4%	PASS	0	PASS	30.0
2.07 Bedroom 2		0.1%	PASS	1	PASS	29.3



Location	Ventilation Strategy	Criteria (a)		Criteria (b)	TM59 Result	Predicted Peak Summer Temperature (°C)
		Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria (a) Status	Criteria (b) % of time room is above threshold temperature		
2.08 Bedroom		0.0%	PASS	11	PASS	28.5
2.09 Bedroom		0.0%	PASS	9	PASS	28.8
2.10 Bedroom 1		0.0%	PASS	13	PASS	29.1
2.11 Bedroom 1		0.8%	PASS	13	PASS	30.4
2.10 Bedroom 2		0.0%	PASS	9	PASS	28.8
2.11 Bedroom 2		0.6%	PASS	13	PASS	30.1
2.12 Bedroom		0.4%	PASS	1	PASS	30.0



9.1.2 Living Spaces

Location	Ventilation Strategy	Criteria (a)		Criteria (b)	TM59 Result	Predicted Peak Summer Temperature (°C)
		Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria (a) Status	Criteria (b) % of time room is above threshold temperature		
G.01 Living / Kitchen	Nat Vent + MVHR + Blinds + g value 0.63	0.3%	PASS	-	PASS	29.5
G.02 Living / Kitchen		0.0%	PASS	-	PASS	28.9
G.03 Living / Kitchen		1.2%	PASS	-	PASS	30.0
G.04 Living / Kitchen		0.9%	PASS	-	PASS	30.1
G.05 Living / Kitchen		0.3%	PASS	-	PASS	29.4
G.06 Living / Kitchen		0.0%	PASS	-	PASS	28.4
G.07 Living / Kitchen		0.5%	PASS	-	PASS	29.9
G.08 Living / Kitchen		1.5%	PASS	-	PASS	30.9
G.08 Living / Kitchen		1.6%	PASS	-	PASS	30.9
G.10 Living / Kitchen		1.7%	PASS	-	PASS	31.0
G.11 Living / Kitchen		1.3%	PASS	-	PASS	30.5
G.12 Living / Kitchen		1.9%	PASS	-	PASS	31.2
1.01 Living / Kitchen		0.1%	PASS	-	PASS	29.1
1.02 Living / Kitchen		0.2%	PASS	-	PASS	29.2
1.03 Living / Kitchen		0.0%	PASS	-	PASS	28.0
1.04 Living / Kitchen		0.3%	PASS	-	PASS	29.5
1.05 Living / Kitchen		1.4%	PASS	-	PASS	30.8
1.06 Living / Kitchen		1.3%	PASS	-	PASS	30.7
1.07 Living / Kitchen		1.4%	PASS	-	PASS	30.6
1.08 Living / Kitchen		1.1%	PASS	-	PASS	30.3
1.09 Living / Kitchen		1.7%	PASS	-	PASS	31.0
1.10 Living / Kitchen		0.5%	PASS	-	PASS	29.7
1.11 Living / Kitchen		0.2%	PASS	-	PASS	29.2
1.12 Living / Kitchen		0.2%	PASS	-	PASS	29.2
1.13 Living / Kitchen		0.0%	PASS	-	PASS	27.6



Location	Ventilation Strategy	Criteria (a)		Criteria (b)	TM59 Result	Predicted Peak Summer Temperature (°C)
		Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria (a) Status	Criteria (b) % of time room is above threshold temperature		
1.14 Living / Kitchen		0.0%	PASS	-	PASS	28.7
1.15 Living / Kitchen		0.9%	PASS	-	PASS	30.0
1.16 Living / Kitchen		1.6%	PASS	-	PASS	30.3
2.01 Living / Kitchen		0.1%	PASS	-	PASS	29.1
2.02 Living / Kitchen		0.0%	PASS	-	PASS	28.9
2.03 Living / Kitchen		1.1%	PASS	-	PASS	30.3
2.04 Living / Kitchen		1.2%	PASS	-	PASS	30.6
2.05 Living / Kitchen		1.2%	PASS	-	PASS	30.5
2.06 Living / Kitchen		0.8%	PASS	-	PASS	30.2
2.07 Living / Kitchen		1.6%	PASS	-	PASS	30.9
2.08 Living / Kitchen		0.0%	PASS	-	PASS	28.5
2.09 Living / Kitchen		0.1%	PASS	-	PASS	28.9
2.10 Living / Kitchen		0.1%	PASS	-	PASS	29.1
2.11 Living / Kitchen		0.6%	PASS	-	PASS	29.7
2.12 Living / Kitchen		1.3%	PASS	-	PASS	30.1



9.1.3 Communal Corridors

Location	Number of annual hours above 28°C	% of annual hours above 28°C	Predicted Peak Summer Temperature (°C)	Corridor Overheating Check
Circulation	0	0.0%	27.7	PASS
Circulation	200	2.3%	28.6	PASS
Circulation	231	2.6%	28.6	PASS
Circulation	195	2.2%	31.4	PASS
Circulation	59	0.7%	31.8	PASS
Circulation	0	0.0%	28.0	PASS
Circulation	125	1.4%	29.5	PASS
Circulation	134	1.5%	28.9	PASS
Circulation	100	1.1%	29.3	PASS
Circulation	0	0.0%	28.0	PASS
Circulation	204	2.3%	32.0	PASS
Circulation	222	2.5%	32.2	PASS
Corridor	158	1.8%	28.8	PASS
Lobby	212	2.4%	31.1	PASS