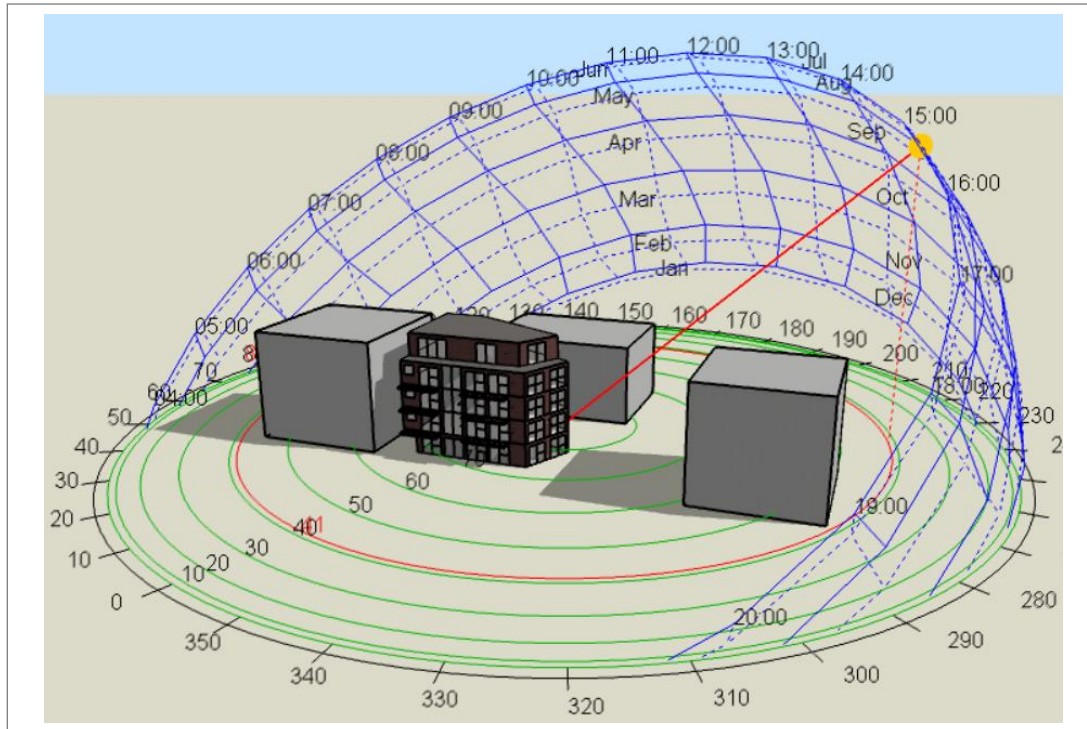




Domestic Overheating Assessment

Dynamic Thermal Modelling - CIBSE TM59

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29/06/2026

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Document Status

Client: B.U Investments Ltd

Site: 12 Canning Crescent,
London,
N22 5SR

Proposals: A new build development to create 9 new build flats.

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Appendix A: TM59 Results

Document Control Record:

Prepared by	Checked by	Date	Job	Revision
MH	MH	29.06.2026	12596	0.0

1 Scope

This report reviews the overheating risk assessment carried out for the proposed residential dwellings on the land of the former 12 Canning Crescent site, Wood Green, using dynamic simulation modelling following the guidance detailed in CIBSE TM59 Design methodology for the assessment of overheating risk in homes (2017).

This report assesses the overheating risk of all habitable spaces within the dwelling. The intention is that this study helps inform and verify the design proposals, thereby providing the basis for mitigating overheating risk and producing a building that provides comfortable environmental conditions for occupants.

It is important to note that with any modelling exercise there are assumptions and approximations that have to be made. As far as possible, details of all assumptions and approximations are supplied within the report. These were predominantly informed by information provided by Urban Designs and should be reviewed carefully.

All results are based on the output from computer modelling software and should be taken as an indication of the likely final situation, but these conditions cannot be guaranteed.

Moreover, this Overheating Assessment across the development supports the Planning Application and demonstrates that the proposed development complies with the relevant current guidance CIBSE TM59: Design Methodology for the Assessment of Overheating Risk in Homes (2017) and the requirements of the Dynamic Simulation of the building regulation in England setting standards for overheating in new residential buildings: Overheating: Approved Part O.



Figure 01.- Thermal model front elevation of proposed development

2 Executive Summary

An overheating assessment has been undertaken for the proposed new flats at the 12 Canning Crescent site, Wood Green in the London borough of Haringey to demonstrate the potential conditions and risk of overheating.

The overheating assessment has been carried out with the guidance set out in CIBSE TM59: *Design Methodology for the Assessment of Overheating in Homes* in accordance with Approved Document Part O. The methodology aims to produce a test that encourages good design that is comfortable within sensible limits while prioritising passive measures to achieving compliance against the overheating assessment criteria.

The dwellings have been assessed against the DSY1 weather file to determine the likelihood of overheating to occur.

The proposed natural ventilation strategy includes openable windows as per the architectural drawings/elevations. Opening schedules are detailed within this report, with maximal permissible opening dimensions on all applicable windows have been assumed.

The overheating assessment has identified that dwellings on the ground and first floor require a hybrid MVHR system (with integrated cooling coil to temper supply air). This is due to security restrictions to opening the windows at night time.

The dwellings on floors 2-4 were found to achieve Part O compliance though a natural ventilation strategy, which involves the balcony/patio door being opened and the glazing fixtures to all spaces being fully openable, which provides sufficient airflow to mitigate the overheating risk. These dwellings also assume the use of dMEV running continuously. However, as these dwellings are close to the compliance threshold, installing an MVHR system may be prudent to ensure a comfortable internal condition is achievable in future weather conditions.

A glazing g value of 0.40 has been considered to all windows and patio doors to prevent excessive solar gains.

Assessment findings

The assessment found that the dwellings were able to meet the TM59 overheating criteria and therefore achieve Part O compliance with the building design described in this report. A summary of measures that form the overheating mitigating strategy include:

- Natural ventilation via window openings as per the architectural drawings.
- Window openings to have the ability to be opened beyond the 100mm restrictors (but conforming with Approved Document K) if and when necessary by the space user to maximise natural ventilation potential.
- Glazing solar performance (g value) of 0.40
- dMEV with flow rates as per Approved Document F minimum requirements for a continuous extract system have been modelled for apartments on floors 2-4
- Hybrid MVHR system to ground and first-floor apartments
- All windows to meet Part O guarding requirements

3 Part O: Dynamic Thermal Modelling Method

In order to demonstrate compliance with the requirements settled by the requirement O1 of the Approved document Part O, the present report has used the Dynamic thermal modelling method approved by the aforementioned document.

To demonstrate compliance using the dynamic thermal modelling method, all of the following have been followed:

- a) CIBSE TM59 methodology for predicting overheating risk
- b) The limits on the use of CIBSE TM59 methodology set out below
- c) The acceptable strategies for reducing overheating risk

Limits on CIBSE's TM59 modelling

All of the following limits on CIBSE's TM59, section 3.3 apply.

- a) When a room is occupied during the day (8am to 11pm), openings should be modelled to do all of the following:
 - i. Start to open when the internal temperature exceeds 22°C
 - ii. Be fully open when the internal temperature exceeds 26°C
 - iii. Start to close when internal temperature falls below 26°C
 - iv. Be fully closed when the internal temperature falls below 22°C
- b) At night (11pm to 8am), openings should be modelled as fully open if both of the following apply:
 - i. The opening is on the first floor or above and not easily accessible
 - ii. The internal temperature exceeds 23°C at 11pm.
- c) When a ground floor of easily accessible room is unoccupied, both of the following apply:
 - i. In the day, windows, patio doors and balcony doors should be modelled as open, if this can be done securely, following the guidance in paragraph 3.7 below.
 - ii. At night, windows, patio doors and balcony doors should be modelled as closed.

An entrance door should be included, which should be shut all the time.

Acceptable strategies for reducing overheating risk

Limiting solar gains

Solar gains in summer should be limited by any of the following means:

- a) Fixed shading devices, comprising any of the following.
 - i. Shutters
 - ii. External blinds
 - iii. Overhangs
 - iv. Awnings
- b) Glazing design, involving any of the following solutions
 - v. Size
 - vi. Orientation
 - vii. g-value
 - viii. Depth of the window reveal
- c) Building design – for example, the placement of balconies
- d) Shading provided by adjacent permanent buildings, structures, or landscaping.

Removing excess heat

Excess heat should be removed from the residential building by any of the following means.

- a) Opening windows (the effectiveness of this method is improved by cross-ventilation)
- b) Ventilation louvres in external walls
- c) A mechanical ventilation system
- d) A mechanical cooling system

4 London Plan Policy

The London Plan Policy SI 4 Managing heat risk states the following:

Development proposals should minimise adverse impacts on the urban heat island (UHI) through design, layout, orientation, materials, and the incorporation of green infrastructure.

Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy:

1. Reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure.
2. Minimise internal heat generation through energy efficient design.
3. Manage the heat within the building through exposed internal thermal mass and high ceilings.
4. Provide passive ventilation.
5. Provide mechanical ventilation.
6. Provide active cooling systems.

Passive ventilation should be prioritised, taking into account external noise and air quality in determining the most appropriate solution. The increased use of air conditioning systems is not desirable as these have significant energy requirements and, under conventional operation, expel hot air, thereby adding to the urban heat island effect. If active cooling systems, such as air conditioning systems, are unavoidable, these should be designed to reuse the waste heat they produce. Future district heating networks are expected to be supplied with heat from waste heat sources such as building cooling systems.

The Chartered Institution of Building Services Engineers (CIBSE) has produced guidance on assessing and mitigating overheating risk in new developments, which can also be applied to refurbishment projects. TM 59 should be used for domestic developments and TM 52 should be used for non-domestic developments. In addition, TM 49 guidance and datasets should also be used to ensure that all new development is designed for the climate it will experience over its design life. Further information will be provided in guidance on how these documents and datasets should be used.

Further details and guidance regarding overheating and cooling are outlined in the Energy Assessment Guidance (2022). Which in section 8 "Cooling and overheating sets out the following recommendations to avoid overheating risks and reduce the impact of UHI effects in new developments:

The London Plan encourages developers to carry out overheating modelling against extreme weather scenarios, which will provide the necessary detail for developers to design developments with appropriate mitigation measures.

The London Plan requires developers to follow the cooling hierarchy to reduce the risk of developments overheating and reduce the impact on the UHI effect through avoiding mechanical cooling where possible and promoting passive cooling measures. Where mechanical cooling is proposed, developers will need to consider the use of low global warming potential refrigerants to reduce harmful emissions.

As per stated above this demonstrates how the scheme has been produced in line with the cooling hierarchy of London Plan Policy SI 4, and has identified the CIBSE TM 59 guidance, presented on the chapter of 4 of this report, as the most appropriate methodology for the assessment of overheating risk of homes.

5 CIBSE TM59 Assessment Criteria

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.

Table 01.- Overheating Assessment Categorisation

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

6 The Model

The building was modelled using Design Builder software (DSB) which is based on the Energy Plus engine. The software complies with CIBSE Application Manual AM11: 1998 Building Energy and Environmental Modelling and provides a full dynamic simulation of thermal conditions in the building.

Geometry

A three-dimensional analysis model has been generated for the proposed scheme. The model was developed using drawn information supplied by Cadoo Studios.

As with any modelling exercise, some approximations have been made, but care has been taken to ensure the scale and internal dimensions of the model are as close as practicable to the design drawings, and that glazing areas are as accurately represented as the provided information allows.

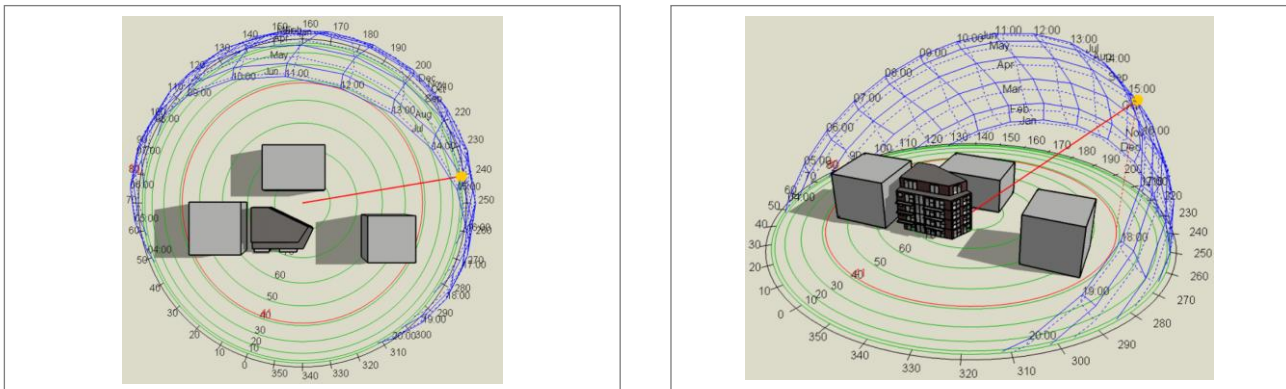


Figure 02.- Site orientation and 3D image of model

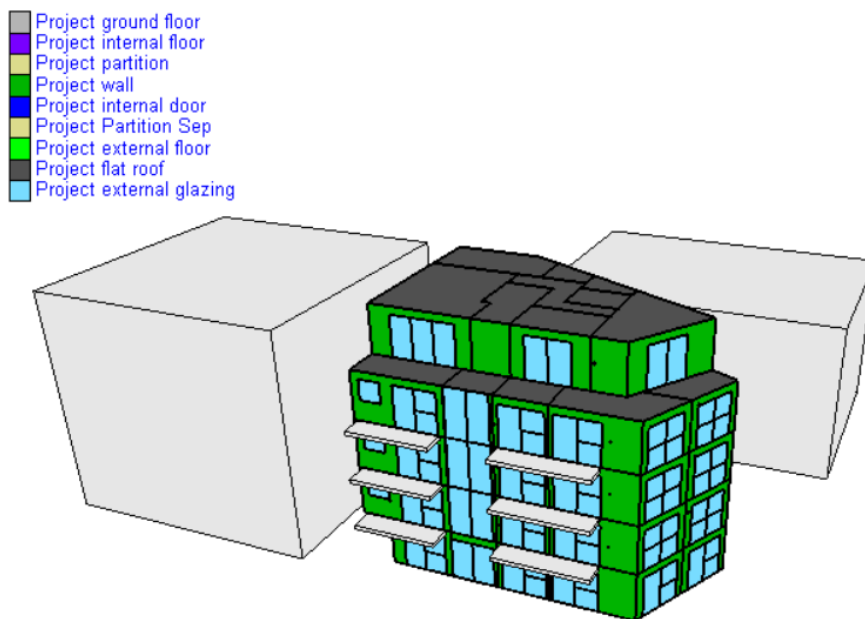


Figure 03.- 3D image of model

Site Location and Climate Data

The CIBSE DSY weather file for London Weather Centre is most appropriate as this best represents the location of the proposed site in Forest Gate.

The weather file contains hourly data for air temperatures (wet bulb and dry bulb), wind speed and direction, atmospheric pressure, solar irradiation and cloud cover.

DSY (Design Summer Year) is the industry standard weather file for use in overheating assessments. It should be noted that the current DSY was used, and future weather files based on various predicted climate change scenarios are available. Usage of these future weather files would

result in higher predicted internal temperatures than reported here as the climate is predicted to encounter more prolonged warm spells and higher peak temperatures as time progresses.

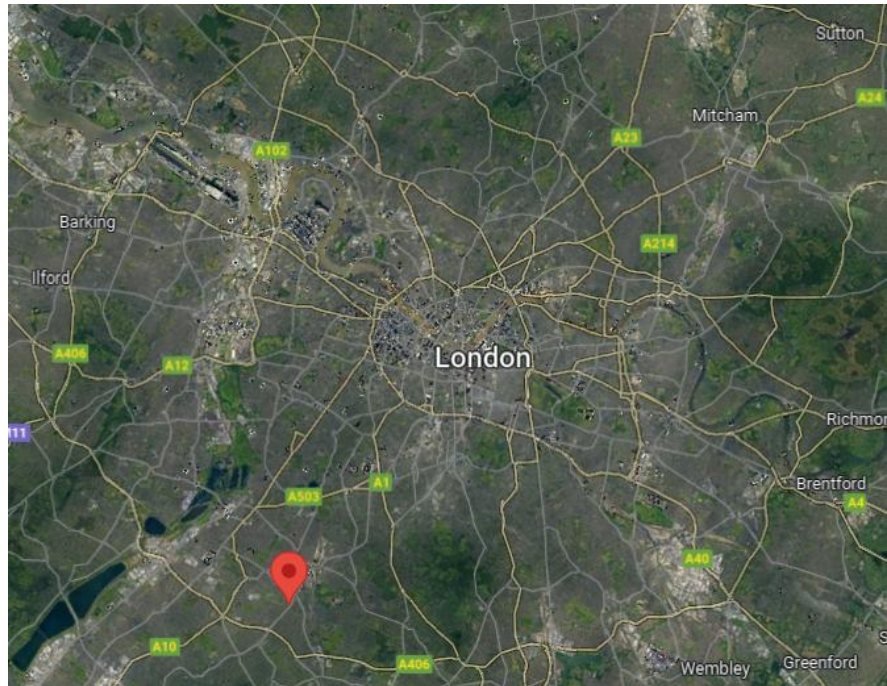


Figure 04.- Proposed site location

Building Construction and U-Values

The design team have provided proposed drawings which were used to create the thermal models.

Table 1 shows the construction U-values and air infiltration used in the thermal model. These figures have been assumed for the proposed development based on historical U values (where applicable).

Table 01: U Values applied to the Dynamic Simulation Model

Element	Modelled U Value (W/m ² K)
External Wall	0.17
Roof	0.12
Ground Floor	0.10
Glazing	1.00
Internal Walls	0.00
Internal Floors	0.00
Air Leakage (m ³ (h.m ²) @ 50Pa	4
Glazing g Value	40%

Internal Gains

The internal heat gains and operating profiles that are applied to each occupied space have been taken from the prescriptive templates outlined in CIBSE TM59 (Design methodology for the assessment of overheating risk in homes). Detailed profiles are shown to the foot of this report.

Accommodation Schedule

The internal heat gains and operating profiles that are applied to each occupied space have been taken from the prescriptive templates outlined in CIBSE TM59 (Design methodology for the assessment of overheating risk in homes). Detailed profiles are shown to the foot of this report.

Window Opening Schedule

An exemplified window opening schedules for the Flat 8 can be seen in the below table.

Table 03: Example Glazing opening schedule of Flat 8 (third floor)

Assessed Space	Total Openable Glazing Area (m ²)	Glazing Opening Type(s)	Total Floor Area (m ²)	Opening Schedule
<u>Third Floor</u>				
Kitchen/Dining/Living	1.6	Top Hung	27.90	ADO Section 2.6a+b
Bedroom 1	3.6	Patio Doors	8.90	ADO Section 2.6a+b
Bedroom 2	4.2	Top Hung + Patio Door	13.00	ADO Section 2.6a+b

Opening Schedules:

- ADO section 2.6a - Daytime only: Glazing can be opened between the hours of 08:00-23:00 but is shut out of these hours. The Part O document stipulates any window which can be easily accessed must be closed or secured resulting in a reduced opening area (such as ground floor doors/windows where openings may be vulnerable to intrusion by a casual or opportunistic burglar).
- ADO Section 2.6a+b - Day and Night: Glazing can be open 24/7 if necessary as these openings are not vulnerable (such as first floor windows etc).

Mechanical Ventilation – MVHR

Mechanical ventilation in the form of a hybrid MVHR system is proposed for the ground and first floor apartments.

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:

- Kitchen/Dining: 13l/s
- Bedrooms: 6l/s (boosted to 20/s)

An integrated cooling coil has been modelled to temper the supply air for peak summer conditions when internal temperatures exceed 24C.

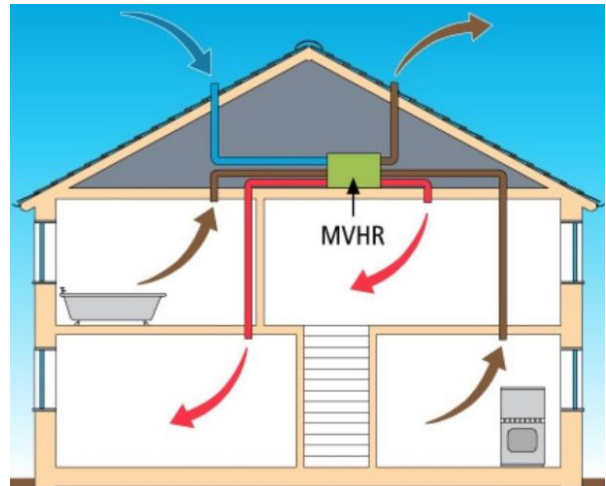


Table 1.3 Minimum whole dwelling ventilation rates by no. of bedrooms

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.

Decentralised Mechanical Extract Ventilation - dMEV

Mechanical ventilation in the form of centralised and/or decentralised mechanical extract ventilation (cMEV / dMEV, respectively) is proposed for the dwellings on the upper floors.

This is a low energy, continuous mechanical extract ventilation system designed to replace conventional bathroom fans (such as intermittent systems) and draw moisture laden air out of the kitchen and wet rooms (bathrooms and utility), providing a quiet and efficient ventilation system.

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 the windows (when opened) or by the trickle ventilators (see section 7.4 below) which are intended always be open.

The minimum extract ventilation rates (high rate and continuous rates) can be seen in tables 1.2 and 1.3 – these have been taken from *Approved Document F*.

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

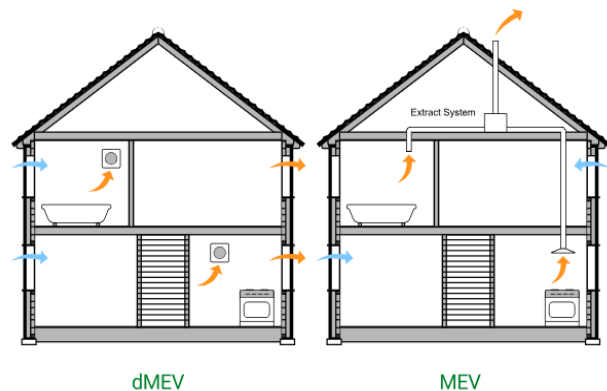
In all dwelling types, the following continuous trickle and boost rates have been modelled;

- Kitchen/Dining: 13l/s
- Bathroom/Utility/Ensuite's: 8l/s
- WC's: 6l/s

Trickle Ventilators

As per section 1.64 of *Approved Document F*, where continuous mechanical extract ventilation is present, trickle/background ventilators must be installed and meet the following conditions:

- a) Not be in wet rooms
- b) Provide a minimum equivalent area of 4000mm² for each habitable room in the dwelling
- c) Provide a minimum total number of ventilators that is the same as the number of bedrooms plus two ventilators (i.e. a one-bedroom dwelling should have three background ventilators, a two bedroom dwelling should have four background ventilators, etc.)



Room	High rate (l/s)	Continuous rate
Kitchen	13	The sum of all extract ventilation in the dwelling on its continuous rate should be at least the whole dwelling ventilation rate given in Table 1.3
Utility room	8	
Bathroom	8	
Sanitary accommodation	6	
NOTE:		
1. If the continuous rate of ventilation provided in a room is equal to or higher than the minimum high rate specified in the table, no extra ventilation is needed.		

7 Results

The details of the proposed overheating mitigation strategy can be seen in the table below.

The full set of TM59 results can be found in Appendix A of this report.

Overheating Mitigation Strategy	TM59/Part O Compliance
• Glazing g-value of 0.40 • Ground and first floor apartments: hybrid MVHR • Floors 2-4 apartments: dMEV continuous extract • All openable windows to meet Part O guarding requirements	Pass

8 Summary

The assessment has shown that the proposed dwellings present an acceptable risk of overheating, provided the mitigation measures in this report are implemented.

All ground floor spaces and first-floor rooms onto balconies are limited to a 'daytime only' window opening schedule which limits the number of hours which natural ventilation can take place. Secondly, these spaces cannot take advantage of cooler night temperatures to purge the room of the warm air from internal and solar gains accumulated throughout the day. Therefore, additional measures beyond what is specified for the apartments on the upper floors must be considered to ensure Part O compliance can be achieved:

- Hybrid MVHR ventilation with integrated cooling coil for air tempering

The overheating strategy measures for the building as a whole includes:

- Natural ventilation via window openings as per the architectural drawings.
- Window openings to have the ability to be opened beyond the 100mm restrictors (but conforming with Approved Document K) if and when necessary by the space user to maximise natural ventilation potential.
- Glazing solar performance (g value) of 0.40
- dMEV with flow rates as per Approved Document F minimum requirements for a continuous extract system have been modelled for units on floors 2-4.

With the above measures implemented, the modelling found all habitable spaces in the all of the flats to pass the overheating criteria and comply with Part O building regulations.

Though the regulations do not permit the use of blinds and curtains in the calculations, if the sun shines directly into a living space, the occupant should consider closing the curtains or blinds to limit solar gains and try and keep rooms as cool as possible.

If it's cooler inside than outside, it is advised that occupants should keep their windows closed, to prevent bringing warm air in. If it reaches a point where the temperature inside the flat is equal to that outside, then you should open the windows, keeping the curtains closed.

Appendix A: TM59 results

Unit	Room	Criterion 1 (%)	Criterion 2 (Hr)	Pass/Fail
1	Kitchen Living	0.00	N/A	Pass
	Bedroom	0.00	5.5	Pass
2	Kitchen Living	0.00	N/A	Pass
	Bedroom 1	0.00	7.0	Pass
	Bedroom 2	0.29	25.0	Pass
3	Kitchen Living	0.00		Pass
	Bedroom	0.00	8.5	Pass
4	Kitchen Living	0.00		Pass
	Bedroom 1	0.00	8.5	Pass
	Bedroom 2	0.00	18.5	Pass
5	Kitchen Living	0.00	N/A	Pass
	Bedroom	0.03	32.0	Pass
6	Kitchen Living	0.13	N/A	Pass
	Bedroom 1	0.15	21.5	Pass
	Bedroom 2	0.46	18.0	Pass
7	Kitchen Living	0.00	N/A	Pass
	Bedroom	0.03	31.0	Pass
8	Kitchen Living	0.18	N/A	Pass
	Bedroom 1	0.23	25.5	Pass
	Bedroom 2	0.49	18.5	Pass
9	Kitchen Living	0.65	N/A	Pass
	Bedroom 1	0.33	28.5	Pass
	Bedroom 2	0.46	22.5	Pass
	Bedroom 3	0.38	24.5	Pass

Appendix B: Detailed Occupancy Schedules – CIBSE TM 59 Heat gain Profile

Number of People	Description /Occupancy	Period																							
		00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24
		Hour ending																							
		1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00
1	Single Bedroom	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7
2	Double Bedroom	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.7
2	Studio	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7
2	1-bedroom /living/Kitchen	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
2	1 - bedroom /living	0	0	0	0	0	0	0	0	0	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0
2	1 - bedroom Kitchen	0	0	0	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0	0
4	2-bedroom /living/Kitchen	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
2	2 - bedroom /living	0	0	0	0	0	0	0	0	0	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0
2	2 - bedroom Kitchen	0	0	0	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0	0
6	3 - bedroom/living/Kitchen	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
3	3 - bedroom /living	0	0	0	0	0	0	0	0	0	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0
3	3 - bedroom Kitchen	0	0	0	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0	0