TM59 - Overheating Risk Assessment

Issue 1 - Issued for Planning
21/12/2022

Braemar Avenue Baptist Church
Wood Green, London, N22 7BY

Prepared for: NTA **on behalf of:** urbanlab_

Prepared by: energylab_Consulting Ltd
18 Wenlock road, London, N1 7TA
Tel: 020 37629608
www.energy-lab.co.uk
info@energy-lab.co.uk

Issue	Date	Issue Details	Changes	Prepared by	Reviewed by	Approved by
0	12/12/2022	Issued WIP for comments	-	KA/YA	MF	MF
1	21/12/2022	Issued for planning	Update to model following review of noise levels by KP acoustics	KA/YA	MA	MA

energylab_
part of **the lab_** collective
18 Wenlock Road
London
N1 7TA
www.energy-lab.co.uk
info@energy-lab.co.uk
T 020 3752 9608

Contents

Executive Summary

This Overheating Risk Assessment was prepared by Energylab Consulting Ltd. in support of the full planning application for the new build development of 15 flats at Braemar Avenue Baptist Church, London N22 7BY to comply with building regulation Part O and CIBSE TM59: 2017 design methodology for assessment of overheating risk in dwellings.

The report confirms that the proposed development remains in compliance with CIBSE TM59 guidelines in reducing the risk of overheating, particularly in summer months. The climate change mitigation measures proposed for this development are in line and in compliance with the relevant and applicable targets and requirement listed within the following planning policies of Haringey Council and the London Plan:

1. Haringey Council's Sustainable Design and Construction Supplementary Planning Document (SPD) (2012)
2. The London Plan relevant planning policies within section 9, i.e. Policy SI 4 - Managing Overheating Risk
3. The Approved Document: Part O 2021

The CIBSE TM59 Assessment provides a robust methodology to analyse and understand the risk of overheating in dwellings as a result of these rising temperatures. This assessment is conducted at the design stage to identify any potential high risk areas, and implement mitigation measures where necessary.

The Overheating Assessment for the proposed development has been developed in line with the London Plan Cooling Hierarchy principles to mitigate overheating risk utilising a passive first approach.

Two models were assessed in IES VE to assess overheating risk in line with the GLA cooling hierarchy utilising CIBSE weather file DSY1:

1. Model A - utilising solely passive cooling measures
2. Model B - utilising mechanical ventilation with heat recovery (MVHR), and MVHR with comfort cooling for at-risk dwellings. (Please refer to section 2.2.3.5 for more information.)

The summarised pass rate for the assessed spaces across each model is displayed below:

1. Model A: **55%**
2. Model B: **86%**

As displayed, the addition of mechanical ventilation with heat recovery (MVHR) supplying fresh air and extracting stale air from occupied spaces ensures 86% are compliant with CIBSE TM59 criteria. It is anticipated that the rooms failing will require additional mitigation measures through active cooling. Please refer to section 4.2.1 for additional information.

1.Introduction

1.1 Existing Site

The site is located on Braemar Avenue, within the London Borough of Haringey. The existing site currently comprises a church building and derelict church hall.

1.2 The Proposal

The proposal is for a mixed-use development comprising a 4 storey new-build block of flats as well as an additional baptist church on the ground and lower ground floors.

The total number of residential units will be 15, comprising 7 No. One Bed Flats, 5 No. Two Bed Flat and 3 No. Three Bed Flats. The residential development will include private outdoor amenity space in the form of a terrace or balcony for each dwelling, waste and recycle storage space, bicycle storage, and amendments to the existing church building.

The non-domestic church building proposal consists of a basement church hall, tea point and WC, with a reception area and WC on the ground floor.

As the proposed church building is not considered a major development, it has not been included in the overheating assessment. The CIBSE TM59 applies only to domestic developments.

Please see Figure 1 for a 3D image of the proposed development.

Figure 1: 3D image of the proposed scheme.

The area schedule for the proposed domestic development is displayed below in Table 1.

Table 1: Domestic Area Schedule	
Building	**Approximate Gross Internal Area (sqm)**
Lower Ground Floor	213.2
Ground Floor	141.2
1st Floor	220.1
2nd Floor	220.1
3rd Floor	124.0

1.3 GLA Domestic Overheating Checklist

The GLA energy planning document, Appendix 5 states, regarding the domestic overheating checklist:

'This checklist is intended to assist designers to identify potential overheating risk in residential accommodation early on in the design process and trigger the incorporation of passive measures within the building envelope and services design to mitigate overheating and reduce cooling demand in line with London Plan policy 5.9.

Section 1 of the checklist should be completed at the start of the design process (concept design) and should be submitted with the preliminary energy information provided to GLA at pre-app stage. Section 1 and 2 should be reviewed as the design progresses and the full checklist should be completed and included within the energy assessment submitted at stage 1 of the planning application.'

Section 1 - Site features affecting vulnerability or overheating		Yes or No
Site location	Urban – within central London or in a high density conurbation	Yes
	Peri-urban – on the suburban fringes of London	No
Air quality and/or Noise sensitivity – are any of the following in the vicinity of buildings?	Busy roads / A roads	No
	Railways / Overground / DLR	No
	Airport / Flight path	No
	Industrial uses / waste facility	No
Proposed building use	Will any buildings be occupied by vulnerable people (e.g. elderly, disabled, young children)?	Yes
	Are residents likely to be at home during the day (e.g. students)?	Yes
Dwelling aspect	Are there any single aspect units?	Yes
Glazing ratio	Is the glazing ratio (glazing: internal floor area) greater than 25%?	Yes
	If yes, is this to allow acceptable levels of daylighting?	Yes
Security - Are there any security issues that could limit opening of windows for ventilation?	Single storey ground floor units	Yes
	Vulnerable areas identified by the Police Architectural Liaison Officer	TBC
	Other	-

Section 2 - Design features implemented to mitigate overheating risk		Please respond
Landscaping	Will deciduous trees be provided for summer shading (to windows and pedestrian routes)?	Yes
	Will green roofs be provided?	Yes
	Will other green or blue infrastructure be provided around buildings for evaporative cooling?	-
Materials	Have high albedo (light colour) materials been specified?	Yes
Dwelling aspect	% of total units that are single aspect	40
	% single aspect with N / NE / NW orientation	0
	% single aspect with E orientation	50
	% single aspect with S / SE / SW orientation	0
	% single aspect with W orientation	50
Glazing ratio - What is the glazing ratio (glazing; internal floor area) on each facade?	N / NE / NW	0.28
	E	0.31
	S / SE / SW	0.24
	W	0.3
Daylighting	What is the average daylight factor range?	-
Window opening	Are windows openable?	Yes
Window opening	What is the average percentage of openable area for the windows?	25
Window opening - What is the extent of the opening?	Fully openable	No
	Limited (e.g. for security, safety, wind loading reasons)	Security

Security	Where there are security issues (e.g. ground floor flats) has an alternative night time natural ventilation method been provided (e.g. ventilation grates)?	No
Shading	Is there any external shading?	Yes
	Is there any internal shading?	Yes
Glazing specification	Is there any solar control glazing?	Yes
Ventilation - What is the ventilation strategy?	Natural - background	Yes
	Natural - purge	Yes
	Mechanical - background (MVHR)	Yes
	Mechanical - purge	Yes
	What is the average design air change rate	0.15
Heating system	Is communal heating present?	No
	What is the flow/return temperature?	-
	Have horizontal pipe runs been minimised?	-
	Do the specifications include insulation levels in line with the London Heat Network Manual	-

1.4 CIBSE TM59 Criteria

A key aspect of the Haringey Council's Sustainable Design and Construction SPD and the Approved Document Part O 2021 is to ensure developments are prepared against rising temperatures. The airtight envelope is critical in reducing energy demand for space heating and domestic hot water, however, this imposes some real challenges related to the risks of overheating.

Appropriate mitigation methods must be adopted and considered throughout the design process to ensure adequate thermal comfort is maintained through the occupancy of the building. CIBSE have produced a methodology to assess the risk of overheating within a domestic building during occupancy.

For predominantly mechanically ventilated rooms, the CIBSE TM59 Overheating Assessment states '*the operative temperature of all rooms shall not exceed 26^{0}C for more than 3% of annual occupied hours'.*

For predominantly naturally ventilated rooms, the CIBSE TM59 Overheating Assessment states:

A. *'For living rooms, kitchens and bedrooms, the number of hours during which ΔT is greater than or equal to 1^{0}K from May to September (or November to March for southern hemisphere locations) shall not exceed 3% of occupied hours.'*
B. *'The operative temperature of the bedrooms from 22:00-07:00 shall not exceed 26^{0}C for more than 1% of annual hours (33 hours is therefore recorded as a fail).'*

Finally, the TM59 states '*that whilst there is no mandatory target for communal corridors, if an operative temperature of 28^{0}C is exceeded for more than 3% of the total annual hours, then this should be identified as a significant risk within the TM59 overheating report.'*

If the stated criteria fail during the assessment, the spaces within the domestic building are considered unacceptable for risk of overheating. Following this, appropriate mitigation measures must be considered following the cooling hierarchy.

2. Strategy

2.1 The Cooling Hierarchy

As stated, the Overheating Assessment for the proposed development has been developed in line with the London Plan Cooling Hierarchy principles to mitigate overheating risk utilising a passive first approach. The cooling hierarchy is outlined below:

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.

This approach aims to counter overheating risk whilst minimising energy consumption through reducing the reliance on air conditioning systems.

Additionally, this strategy is encouraged within Haringey Council's Sustainable Design and Construction SPD, stating '*Buildings should avoid overheating during summer months without reliance on energy intensive mechanical cooling systems.*'

2.2 Proposed Strategy

The cooling strategy proposed has been developed in line with the GLA Cooling Hierarchy. Please see the to proposed response each stage of the cooling hierarchy below:

1. Solar gain has been reduced through the following:

   a) There is limited capability in altering orientation due to the constraints of the site.
   b) Glazing with a G-value of 0.35 has been specified to mitigate solar gain.
   c) The building has large areas to the north-east and south-west façade providing local shade.
   d) External shading for a number of dwellings utilising balconies.
   e) A green sedum roof has been proposed for 100% of the total roof area.

2. Energy efficient equipment has been proposed to reduce internal gains, such as:

   a) High efficiency LED lighting
   b) Energy efficient appliances

3. The buildings thermal mass and internal heights have been maximised within the confines of the site, structure and location, allowing heat to dissipate from occupied spaces.

4. Natural ventilation has been proposed for all circulation areas and the Studio flat in Building 9 through the incorporation of openable windows and trickle vents.

5. Mechanical ventilation is proposed:
    a) Centralised continuous mechanical ventilation with heat recovery (MVHR) has been proposed to service all dwellings.

6. No active cooling systems are currently proposed for the development, mitigating '*reliance on energy intensive mechanical cooling systems.'* That being said, active cooling systems may be required for any occupied spaces failing CIBSE TM59 criteria. Please refer to section 4.2.

3. Methodology

3.1 Software Utilised

This assessment has been carried out using dynamic modelling software Integrated Environmental Solutions Virtual Environment (IES VE). All dwellings have been modelled specifying the building fabric, glazing and systems, providing an accurate representation of the proposed development.

The thermal calculations were conducted utilising Apachesim within IES VE.

3.2 Model Inputs

3.2.1 Construction

Table 2 displays the proposed fabric properties utilised for the model.

Table 2: Proposed Fabric Properties and Part L 2021 Fabric Standards for Domestic and Non-Domestic Developments

	Proposed Design	Part L Limiting Values
Walls U-Value Target	0.14 W/m^2.k	0.26 W/m^2.k
Floors U-Value Target	0.1 W/m^2.k	0.18 W/m^2.k
Roofs U-Value Target	0.11 W/m^2.k	0.16 W/m^2.k
Doors U-Value Target	1 W/m^2.k	1.6 W/m^2.k
Windows U-Value Target	1 W/m^2.k	1.6 W/m^2.k
Windows G Value Target	0.35	-
Glazing Transmittance	0.7	-
Air Permeability Target	3 m^3/h.m^2@50pa	8 m^3/h.m^2@50p
Thermal Bridging Target	0.04 (y-value)	0.2 (y-value)
Heating system pipework	Insulated pipework and fittings within the plant room to reduce heat loss (All primary pipework insulated to reduce heat loss - domestic hot water and heating).	
Thermal Mass	Medium	-
Green Roof	100% of the roof total area for domestic and non domestic buildings	

3.2.2 Weather Files

To accurately simulate the periods in a year in which overheating is likely to occur, the 'design summer year' (DSY) weather files must be used as per the CIBSE TM49. Three CIBSE weather files are available:

1. DSY1 - a moderately warm summer
2. DSY2 - a summer with a short intense spell
3. DSY3 - a summer with a longer less intense warm spell

The DSY1 weather file has been utilised to determine compliance with the TM59 requirements as per CIBSE guidance. The DSY2 and DSY3 files are used as a method of 'future-proofing' developments; to further ensure they are prepared against rising temperatures.

3.2.5 Internal Gains

Occupancy, equipment and lighting gains/profiles are fixed and defined in Appendices A and B as per the CIBSE TM59 for different types of residential spaces, (bedrooms, living rooms, kitchens etc.):

- Bedrooms are set with 24 hr occupancy (1 person in daytime, 1 person in single bedroom at night, 2 people in double bedroom at night).
- Kitchens and living rooms are occupied during the day, and unoccupied during sleeping hours.
- Occupant gains: 75 W/person (sensible), 55 W/person (latent); 30% reduction when sleeping.
- Lighting gains: 2 W/m^2 between 6 pm and 11 pm for efficient new-builds. Higher values should be used for existing buildings or specialist design.
- Corridors: Corridors must be analysed if community heating pipework runs through them.

2.2.3 Solar Gain

Solar gain is modelled using the SunCast (solar shading analysis) module within IES VE. This models any internal gains into the development based on its orientation and the position of the sun. Please see Figures 2a and 2b for images of the model with and without the surrounding buildings, respectively.

Figure 2a - IES VE Model (Without Local Shade)

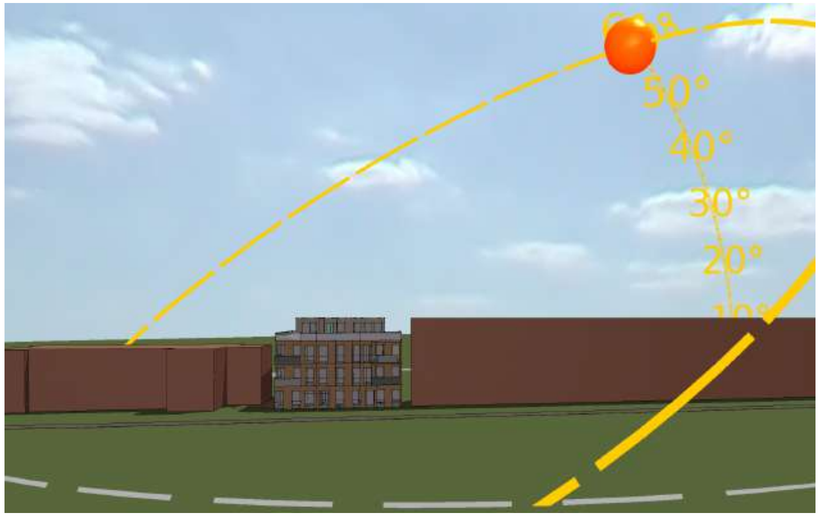

Figure 2b - IES VE Model (With Local Shade)

2.2.3 Security, Noise and Pollution

2.2.3.1 Acoustics

The Approved Document Part O 2021 states in areas where noise may pose an issue during sleeping hours (11pm - 7am), ventilation should not be reliant on openable windows:

'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).'

A Noise Impact Assessment was conducted by KP Acoustics Ltd. in July 2022. The results from the survey displayed an average noise level of 44dB during sleeping hours in the proposed amenity spaces.

Further analysis was conducted by KP Acoustics to determine the allowable free area for bedrooms to remain in compliance with Part O 2021 regulation during sleeping hours. 15% free opening area was advised by KP Acoustics. The model has therefore incorporated a maximum 15% openable area during sleeping hours to ensure noise levels are compliant.

2.2.3.2 Security

Furthermore, the Approved Document Document Part O states, '*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.'*

Dwellings along the ground floor are, therefore, at risk of intrusion. As a result of this, all amenity doors modelled have been left closed during sleeping hours to ensure thermal comfort is not solely dependent on the opening of doors and windows.

2.2.3.3 Pollution

Additionally, Approved Document Part O states '*Buildings located near to significant local pollution sources should be designed to minimise the intake* *of external air pollutants.'* Once again, with the site being located near central London, it may be subject to poor air quality during congested hours, therefore, mitigating the reliance site can have on openable windows.

2.2.3.4 Passive Ventilation

The windows have been modelled to open when the internal room temperature exceeds 22.0˚C. An opening swing-angle of 25˚ has been specified for the bottom-hung windows. The glazed doors are open when the internal room temperature is >22.0˚C and assumes a fully open sliding patio style mechanism. Internal doors are assumed to be always open with the exception of flat entrance doors from the landlord's circulation corridors which are assumed to be closed.

The buildings shall be predominantly natural ventilation via openable windows/doors in addition to MVHR ventilation operating in summer bypass modes to increase ventilation flow rates to occupied areas.

2.2.3.5 Mechanical Ventilation with Heat Recovery (MVHR)

The bathroom, bedrooms and living/kitchen/dining spaces are mechanically ventilated by mechanical ventilation heat recovery (MVHR). The volume of air is based on the Approved Document Part F continuous extraction rates. Each room has a small amount of air infiltration, this has been set at 0.15 air changes per hour (ACH), in line with CIBSE Guide TM59.

For dwellings at significant risk of overheating, the *Zehnder ComfoClime 36 with ComfoAir Q600* was utilised within the model. This is an MVHR unit with a 2.6kW comfort cooling capacity. This unit was utilised for the following dwellings: *Unit 0.5, Unit 1.4, Unit 2.1, Unit 2.4 and Unit 3.2.* Please see Figure 3 for an image of the proposed unit.

Figure 3: Zehnder ComfoClime 36 with ComfoAir Q600

4. Results

All results have been obtained utilising the DSY1 weather file, required for compliance with CIBSE TM59 criteria.

4.1 Model A

Model A utilises solely passive measures with natural ventilation. All windows were modelled to open with 15% free area when temperatures exceeded 22°C. The openable areas are displayed by the green areas in Figure 4.

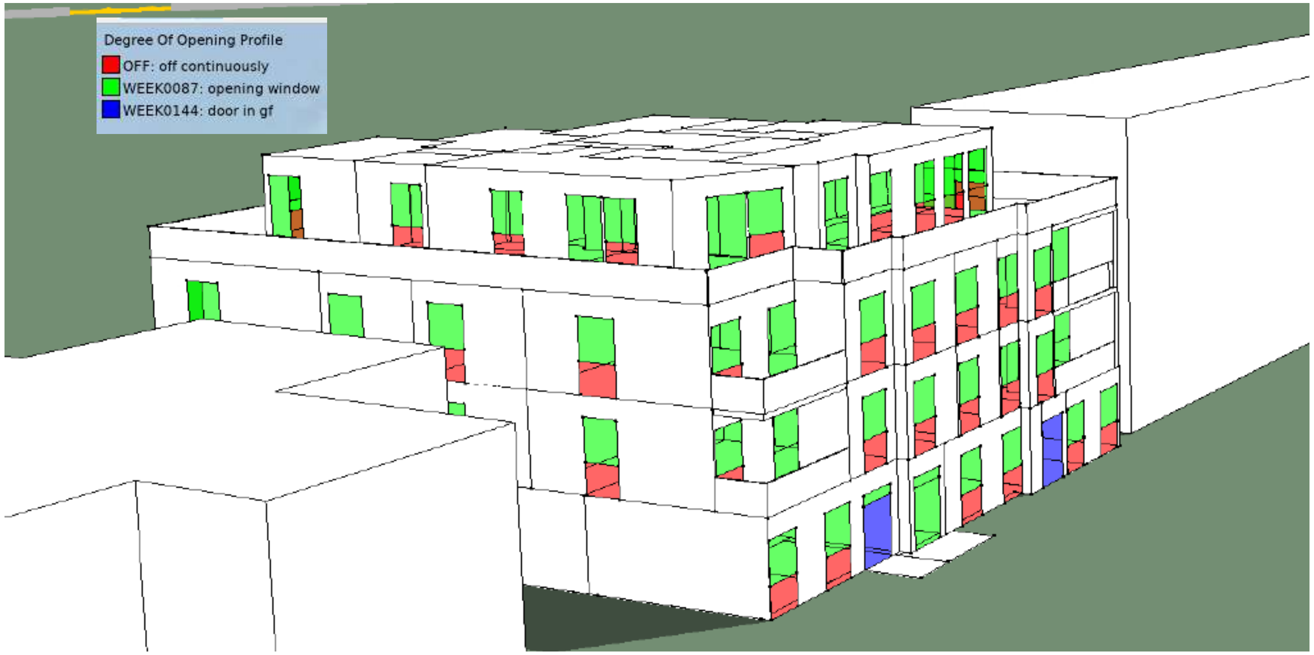

Figure 4: IES Model Displaying Highlighted Openable Windows

For predominantly naturally ventilated rooms, the CIBSE TM59 Overheating Assessment states:

Criteria 1: 'For living rooms, kitchens and bedrooms, the number of hours during which ΔT is greater than or equal to 1°K from May to September (or November to March for southern hemisphere locations) shall not exceed 3% of occupied hours.'

Criteria 2: 'The operative temperature of the bedrooms from 22:00-07:00 shall not exceed 26°C for more than 1% of annual hours (33 hours is therefore recorded as a fail).'

Table 3: TM59 Overheating Results (Model A - Solely Passive Measures)

Room Name	Criteria 1: %hrs Top-Tmax >= 1K	Criteria 2: Night hours OT>26°C	Criteria Failed	Pass/Fail
B1 - U 0.1	0.6	21	-	Pass
B1 - U 0.2	0.4	14	-	Pass
B1 - U 0.4	0.7	21	-	Pass
B1 - U 0.5	0.5	39	2.	Fail
B1 - unit 1.1	0.5	38	2.	Fail
B1 - unit 1.2	0.7	24	-	Pass
B1 - unit 1.3	0.7	14	-	Pass
B1 - 1.4	0.5	38	2.	Fail
B1 - unit 2.1	0.5	38	2.	Fail

B1 - unit 2.2	0.7	24	-	**Pass**
B1 - unit 2.3	0.7	14	-	**Pass**
B1 - unit 2.4	0.5	38	2.	**Fail**
B1 - unit 3.1	0.8	12	-	**Pass**
B1 - unit 3.2	0.7	14	-	**Pass**
B2 - U 0.1	0.6	21	-	**Pass**
B2 - U 0.2	0.5	27	-	**Pass**
B2 - U 0.3	0.5	21	-	**Pass**
B2 - U 0.3	0.5	23	-	**Pass**
B2 - U 0.4	0.8	12	-	**Pass**
B2 - unit 1.2	0.7	35	2.	**Fail**
B2 - unit 2.2	0.8	32	-	**Pass**
B2 - unit 3.1	0.8	13	-	**Pass**
B2 - unit 3.2	0.8	24	-	**Pass**
B3 - U 0.4	0.8	12	-	**Pass**
B3 - unit 1.2	0.7	31	-	**Pass**

B3 - unit 2.2	0.7	28	-	Pass
K/dining - unit 1.2	1.3	N/A	1.	Fail
Living & K/ Dining - U 0.4	1.2	N/A	1.	Fail
Living & K/ Dining - unit 2.3	1	0	1.	Pass
Living & K/Dining - U 0.1	1.2	N/A	-	Fail
Living & K/Dining - U 0.2	0.7	N/A	-	Pass
Living & K/Dining - U 0.3	1.2	N/A	1.	Fail
Living & K/Dining - U 0.5	1.2	N/A	1.	Fail
Living & K/dining - unit 1.1	1.2	N/A	1.	Fail
Living & K/Dining - unit 1.3	0.9	N/A	-	Pass
Living & K/dining - unit 1.4	1.3	N/A	1.	Fail
Living & K/Dining - unit 2.1	1.2	N/A	1.	Fail
Living & K/Dining - unit 2.2	1.5	N/A	1.	Fail
Living & K/Dining - unit 2.4	1.5	N/A	1.	Fail
Living & K/Dining - unit 3.1	1.4	N/A	1.	Fail
Living & K/Dining - unit 3.2	1.5	N/A	1.	Fail

Living - unit 1.2	1.4	N/A	1.	**Fail**

As displayed by Table 3, solely passive measures, utilising openable doors and windows is not sufficient to achieve compliance with CIBSE TM59 criteria. Only **55%** of the occupied rooms passed.

4.2 Model B

Model B utilises continuous mechanical ventilation with heat recovery (MVHR). This allows for stale air to be extracted from spaces when humidity and temperature rise above a certain threshold, whilst supplying fresh air to the occupied spaces. The results are displayed in Table 4.

For predominantly mechanically ventilated rooms, the CIBSE TM59 Overheating Assessment states '*the operative temperature of all rooms shall not exceed 26^{o}C for more than 3% of annual occupied hours'.*

Table 4: TM59 Overheating Results (Model B - Passive Measures with MVHR)

Room Name	Criteria 1: %hrs Top-Tmax >= 1K	Criteria 2: Night hours OT>26°C	Criteria Failed	Hours Exceeding the Criteria 2 Limit	Pass/Fail
B1 - U 0.1	0.5	29	-	-	**Pass**
B1 - U 0.2	1.1	14	-	-	**Pass**
B1 - U 0.4	0.6	33	2	1	**Fail**
B1 - U 0.5	1	32	-	-	**Pass**
B1 - unit 1.1	0.6	26	-	-	**Pass**
B1 - unit 1.2	0.5	35	2	3	**Fail**
B1 - unit 1.3	1.9	14	-	-	**Pass**
B1 - unit 1.4	0.6	28	-	-	**Pass**

B1 - unit 2.1	0.5	26	-	-	**Pass**
B1 - unit 2.2	2.1	37	2	5	**Fail**
B1 - unit 2.3	0.6	28	-	-	**Pass**
B1 - unit 2.4	0.5	28	-	-	**Pass**
B1 - unit 3.1	1.1	13	-	-	**Pass**
B1 - unit 3.2	0.8	14	-	-	**Pass**
B2 - U 0.1	0.7	22	-	-	**Pass**
B2 - U 0.2	0.8	28	-	-	**Pass**
B2 - U 0.3	0.7	28	-	-	**Pass**
B2 - U 0.3	0.7	29	-	-	**Pass**
B2 - U 0.4	0.7	12	-	-	**Pass**
B2 - unit 1.2	1.8	36	2	4	**Fail**
B2 - unit 2.2	2.3	37	2	5	**Fail**
B2 - unit 3.1	0.8	14	-	-	**Pass**
B2 - unit 3.2	1.2	31	-	-	**Pass**
B3 - U 0.4	0.9	13	-	-	**Pass**

B3 - unit 1.2	1.1	30	-	-	**Pass**
B3 - unit 2.2	1.6	32	-	-	**Pass**
K/dining - unit 1.2	1	N/A	-	-	**Pass**
Living & K/ Dining - U 0.4	1.4	N/A	-	-	**Pass**
Living & K/ Dining - unit 2.3	1.6	N/A	-	-	**Pass**
Living & K/Dining - U 0.1	1.5	N/A	-	-	**Pass**
Living & K/Dining - U 0.2	1	N/A	-	-	**Pass**
Living & K/Dining - U 0.3	1.5	N/A	-	-	**Pass**
Living & K/Dining - U 0.5	1.3	N/A	-	-	**Pass**
living & K/dining - unit 1.1	1	N/A	-	-	**Pass**
Living & K/Dining - unit 1.3	1.3	N/A	-	-	**Pass**
Living & K/dining - unit 1.4	1.3	N/A	-	-	**Pass**
Living & K/Dining - unit 2.1	1.1	N/A	-	-	**Pass**
Living & K/Dining - unit 2.2	1.3	N/A	-	-	**Pass**
Living & K/Dining - unit 2.4	1.6	N/A	-	-	**Pass**
Living & K/Dining - unit 3.1	1.4	N/A	-	-	**Pass**

Living & K/Dining - unit 3.2	3.7	N/A	1	-	**Fail**
living room - unit 1.2	1.9	N/A	-	-	**Pass**

As displayed by Table 3, when MVHR is employed, all occupied spaces are compliant with TM59 criteria, with exception for five bedrooms, failing Criteria 2, and one bedroom failing Criteria 1.

It is anticipated that further mitigation measures must be adopted for the spaces failing Criteria 2: *B1 - Unit 0.4, B1 - Unit 1.2, B1 - Unit 2.2, B2 - Unit 1.2 and B2 - Unit 2.2,* as well as the *Living & K/Dining - unit 3.2* failing Criteria 1. That being said, failure is marginal, with the worst-case scenario being in *B1 - Unit 2.2 and B2 - Unit 2.2*, exceeding Criteria 2 for an estimated 5 hours annually.

Additional cooling could be achieved through active cooling methods for these high risk spaces. Due to constraints on available external space, active cooling through water-cooled air conditioning units (without external units) is suggested for the bedrooms failing Criteria 2. These units can be wall-mounted, providing controlled AC when desired by the occupants. Please see Figure 5 for an example of this technology.

Figure 5: Example of Wall-Mounted AC in Bedroom

5. Conclusion

This Overheating Risk Assessment was prepared by Energylab Consulting Ltd. in support of the full planning application for the new build development of 15 flats at Braemar Avenue Baptist Church, London N22 7BY to comply with building regulation Part O and CIBSE TM59: 2017 design methodology for assessment of overheating risk in dwellings.

The report confirms that the proposed development remains in compliance with CIBSE TM59 guidelines in reducing the risk of overheating, particularly in summer months. The climate change mitigation measures proposed for this development are in line and in compliance with the relevant and applicable targets and requirement listed within the following planning policies of Haringey Council and the London Plan:

1. Haringey Council's Sustainable Design and Construction Supplementary Planning Document (SPD) (2012)
2. The London Plan relevant planning policies within section 9, i.e. Policy SI 4 - Managing Overheating Risk
3. The Approved Document: Part O 2021

The CIBSE TM59 Assessment provides a robust methodology to analyse and understand the risk of overheating in dwellings as a result of these rising temperatures. This assessment is conducted at the design stage to identify any potential high risk areas, and implement mitigation measures where necessary.

The Overheating Assessment for the proposed development has been developed in line with the London Plan Cooling Hierarchy principles to mitigate overheating risk utilising a passive first approach.

Two models were assessed in IES VE to assess overheating risk in line with the GLA cooling hierarchy utilising CIBSE weather file DSY1:

1. Model A - utilising solely passive cooling measures
2. Model B - utilising mechanical ventilation with heat recovery (MVHR), and MVHR with comfort cooling for at-risk dwellings. (Please refer to section 2.2.3.5 for more information.)

The summarised pass rate for the assessed spaces across each model is displayed below:

1. Model A: **55%**
2. Model B: **86%**

As displayed, the addition of mechanical ventilation with heat recovery (MVHR) supplying fresh air and extracting stale air from occupied spaces ensures 86% are compliant with CIBSE TM59 criteria. It is anticipated that the rooms failing will require additional mitigation measures through active cooling. Please refer to section 4.2.1 for additional information.

Appendix A: Occupancy and Equipment Gains

Number of people	Description	Peak load (W)		Period																							
		Sensible	Latent	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 occupancy	75	55	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 ccupancy	150	110	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	1	0.7
2	Studio occupancy	150	110	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
1	1-bedroom living/kitchen occupancy	75	55	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
1	1-bedroom living occupancy	75	55	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
1	1-bedroom kitchen occupancy	75	55	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
2	2-bedroom living/kitchen occupancy	150	110	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 occupancy	150	110	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 occupancy	150	110	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
3	3-bedroom living/kitchen occupancy	225	165	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 occupancy	225	165	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 occupancy	225	165	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
	Single bedroom equipment	80		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.13
	Double bedroom equipment	80		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.13
	Studio equipment	450		0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1	1	0.44	0.44	0.24	0.24
	Living/litchen equipment	450		0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1	1	0.44	0.44	0.24	0.24
	Living equipment	150		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1	1	1	1	0.4	0.4
	Kitchen equipment	300		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	1	1	0.17	0.17	0.17	0.17
	Lighting profile	2 (W/m2)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0

Appendix B: CIBSE TM59 Profiles

Table 2 Occupancy and equipment gain descriptions

Unit/ room type	Occupancy	Equipment load
Studio	2 people at all times	Peak load of 450 W from 6 pm to 8 pm*. 200 W from 8 pm to 10 pm 110 W from 9 am to 6 pm and 10 pm to 12 pm Base load of 85 W for the rest of the day
1-bedroom apartment: living room/kitchen	1 person from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 450 W from 6 pm to 8 pm 200 W from 8 pm to 10 pm 110 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 85 W for the rest of the day
1-bedroom apartment: living room	1 person at 75% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 150 W from 6 pm to 10 pm 60 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 35 W for the rest of the day
1-bedroom apartment: kitchen	1 person at 25% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 300 W from 6 pm to 8 pm Base load of 50 W for the rest of the day
2-bedroom apartment: living room/kitchen	2 people from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 450 W from 6 pm to 8 pm 200 W from 8 pm to 10 pm 110 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 85 W for the rest of the day
2-bedroom apartment: living room	2 people at 75% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 150 W from 6 pm to 10 pm 60 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 35 W for the rest of the day
2-bedroom apartment: kitchen	2 people at 25% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 300 W from 6 pm to 8 pm Base load of 50 W for the rest of the day
3-bedroom apartment: living room/kitchen	3 people from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 450 W from 6 pm to 8 pm 200W from 8 pm to 10 pm 110 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 85 W for the rest of the day
3-bedroom apartment: living room	3 people at 5% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 150 W from 6 pm to 10 pm 60 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 35 W for the rest of the day
3-bedroom apartment: kitchen	3 people at 25% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 300 W from 6 pm to 8 pm base load of 50 W for the rest of the day
Double bedroom	2 people at 70% gains from 11 pm to 8 am 2 people at full gains from 8 am to 9 am and from 10 pm to 11 pm 1 person at full gain in the bedroom from 9 am to 10 pm	Peak load of 80 W from 8 am to 11 pm Base load of 10 W during the sleeping hours
Single bedroom (too small to accommodate double bed)	1 person at 70% gains from 11 pm to 8 am 1 person at full gains from 8 am to 11 pm	Peak load of 80 W from 8 am to 11 pm Base load of 10 W during sleeping hours

energylab_

Building Services and Sustainability Designers

energylab_ is a dynamic consultancy specialising in sustainability and sustainable design. We have extensive experience in both design and management across a broad range of sectors where we aim to embrace circular economy principles and low energy design practices.

Our vision is to deliver efficient and flexible environments which are engineered to help people work in an sustainable, effective and collaborative way.

We have a proactive approach to spatial design and how building services integrate within the space. We offer our clients a high quality service by working closely with them and their team to achieve a successful end product which meets the ESG agenda.

energylab_ wants to change that way of working by providing a more strategic and integrated approach to workplace design.

We do things differently……..

part of the lab_ collective:

the lab_
spacelab_
urbanlab_
the lab foundation_
sense_
eel_

For further details relating to the information contained within this document please contact:

Kamran Afshar, Graduate Sustainability Consultant
kamran.afshar@energy-lab.co.uk

energylab_
part of the lab_ collective
18 Wenlock Rd, London
offices also in Greater Manchester
www.energy-lab.co.uk
info@energy-lab.co.uk
T 020 3752 9608