SW08
Overheating Report

University College London
Life and Medical Sciences Small Works Programme

University College London
Small Works 08

for

University College London

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P1	Issue for Planning	22.02.2023	MDW	JC
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1 INTRODUCTION

Kendall Kingscott have been appointed to undertake overheating calculations for the areas of the building that are due to be refurbished as part of a minor works programme.

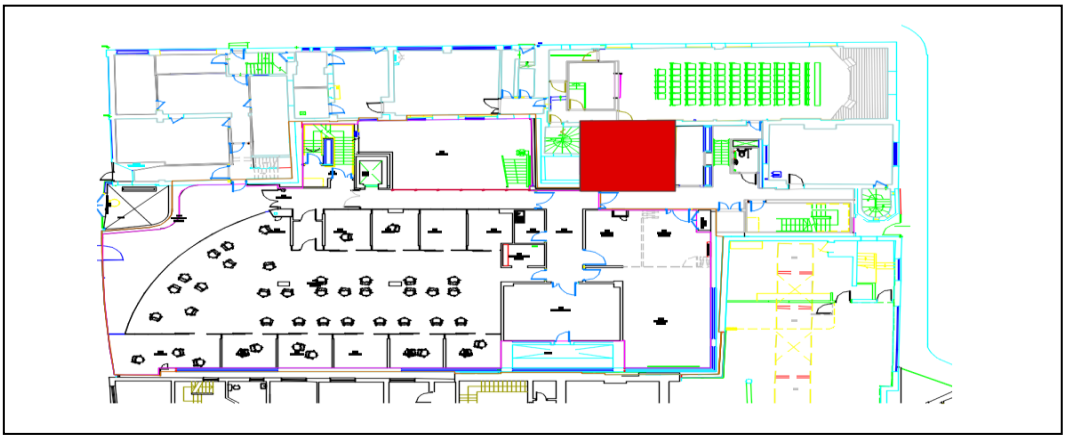
Reference has been made to the Camden Local Plan Guidance on Energy Efficiency and Adaptation together with UCL design guidance.

The cooling hierarchy is discussed in section 4.

The project is located within Ear Institute, 332 Gray's Inn Road, London, WC1X 8EE. The works comprise the refurbishment of a study room and Audiology room within the Ear Institute at Gray's Inn Road

2 EXISTING SYSTEMS

The drawing extract below shows the area within the building where the proposed upgrade works are located.



Ground Rm G36

The existing systems include the following:

G36 is located at ground floor level and comprises brick walls, single glazed windows and a pitched roof which is open to the room. The existing room is heated with electric panel heaters.

3 PROPOSED SYSTEMS

The systems proposed for the upgraded areas comprise:

G36: It is proposed to replace the existing electric panel heaters with a heat pump to reduce CO2 emissions and energy usage. One window faces onto an adjacent internal area, one window does not have opening lights and the third has a small opening light which provides minimal ventilation. It is proposed to install roof lights to provide natural light and natural ventilation. The pitched roof will have thermal insulation added under the existing roof construction.

4 COOLING HIERARCHY

The hierarchy shown in the London Plan, the Camden Local Plan Guide and UCL Sustainable Building Standard 2020 have been followed and are summarised in the following table.

Requirement	Sustainability Remark
Reduce the amount of heat entering the building from outside in summer	G36: The existing roof will be insulated. It is not considered feasible to upgrade the existing fenestration.
Minimise internal heat gains	G36: New energy efficient lighting and IT equipment is proposed for the area. The space needs to be fit for the proposed purpose
Manage heat within the building through exposed thermal mass and high ceilings	G36: The room is within an existing building and there no scope for managing the heat through thermal mass.
Provide passive ventilation	G36: Additional roof lights are to be provided.
Provide mechanical ventilation	G36: It is not proposed to install mechanical ventilation.
Provide active cooling	G36: It is proposed to install a heat pump for heating. The cooling function will be limited to prevent overheating in excessive summer conditions only.

5 OVERHEATING ANALYSIS

5.1 GENERAL

This report details the overheating analysis that has been undertaken in line with the procedures described in CIBSE TM 52 - The limits of thermal comfort: avoiding overheating. This provides an adaptive overheating modelling approach, which has been used in conjunction with a dynamic simulation model for the proposed areas of work.

Calculations have been completed using approved National Calculation Method (NCM) data and procedures appropriate to the proposed use of the building.

The assessment has been completed assuming that limitations on window openings are as per existing. Mechanical ventilation has been modelled, where this is proposed within the services design for each space.

Where spaces cannot meet overheating compliance criteria, comfort cooling should be provided to ensure that suitable internal temperatures can be maintained.

5.2 CRITERIAN OVERVIEW

TM52's adaptive overheating assessment tests rooms against three criteria. If a room fails any two of the three criteria then it is said to overheat.

The three compliance criteria are:

1. A limit for the number of hours that the operative temperature exceeds the comfort temperature by 1°C or more during the occupied hours over the summer period (1st May to 30th September).

2. The severity of the overheating within any one day. This sets a daily limit for acceptability.

3. An absolute maximum daily temperature for the room.

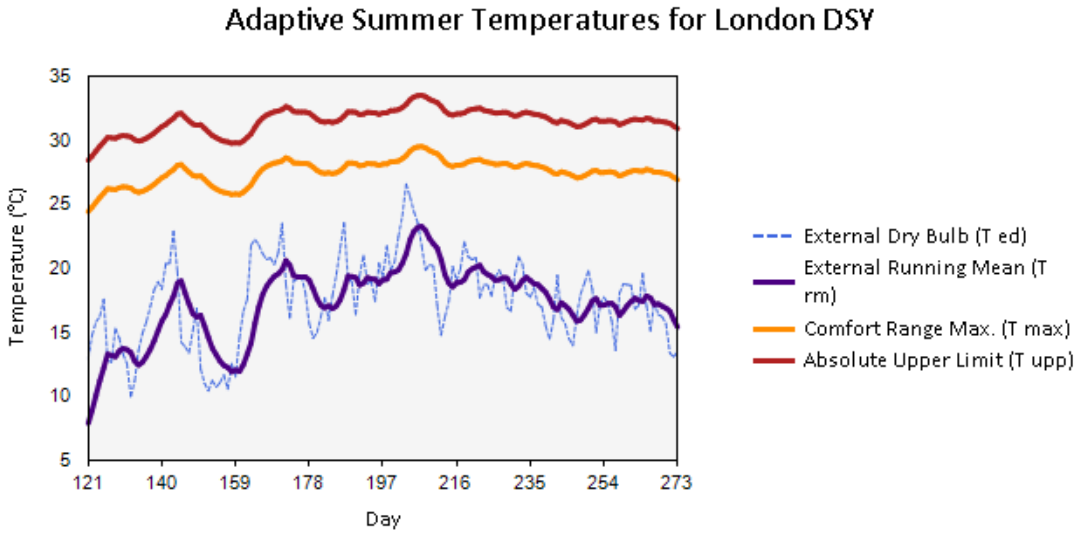


Figure 1.3: Temperature Threshold Range for London

Figure 1.3, above, illustrates the mapping of the comfort and absolute temperature ranges against external temperature during the summer period.

5.3 MODEL RESULTS

The results of the overheating assessment are recorded in *Figure 2.2*, below.

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Criterion 2: Peak Daily Weighted Exceedance	Criterion 3: #Hours Exceeding Absolute Limit	Result
Study room 1 (G36)	1530	45	370	20.0	0	Fail

Figure 2.2

The results indicate a non-complaint model with excessive overheating. The modelled spaces all require comfort cooling to ensure suitable environmental conditions.

6 CONCLUSION

The results record varying levels of overheating across the modelled accommodation. Whilst Study Room 1 (G36) complies with Criterion 3, Criterion 1 and Criterion 2 were not met in the modelled spaces.

As such, overheating is deemed to be a risk as defined by CIBSE TM52. Comfort cooling will be required to mitigate the overheating risk and ensure that suitable internal conditions can be maintained.