Kendall Kingscott

SW23
Overheating Report

University College London
Life and Medical Sciences Small Works Programme

University College London
Small Works 23

for

University College London

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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 refurbishment 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.

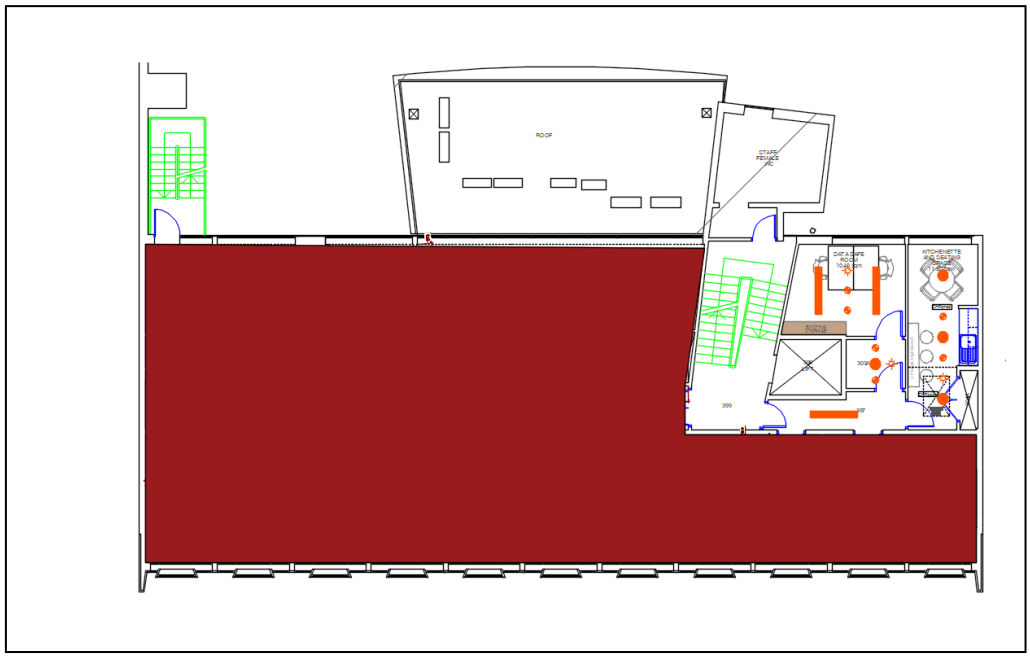
The cooling hierarchy is discussed in section 4.

The project is located within 222 Euston Road, London.

The works comprises remodelling the existing 3rd floor to create a series of agile working spaces, meeting rooms, an enhanced kitchenette/seating area and office space.

2 EXISTING SYSTEMS

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



The existing systems include the following:

Mechanical supply and extract providing a small quantity of fresh air to the core area. The existing windows are a mix of single and double glazed units of varying ages. The older windows have secondary glazing fitted which restricts the opening area. The newer units are double glazed and have window opening restrictors for safety reasons.

Radiators are provided along the perimeter within builders work casings with top and side grilles. In the past, DX heating and cooling has been added to provide comfort cooling.

3 PROPOSED SYSTEMS

The systems proposed for the upgraded areas comprise:

The existing ventilation will be reconfigured to the new room layout. The existing windows will be retained.

The existing DX system will be replaced with new more efficient systems.

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	There is no scope to reduce heat entering the building further. It is not considered feasible to upgrade the existing fenestration.
Minimise internal heat gains	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	The rooms are within an existing building and there no further scope for managing the heat through thermal mass
Provide passive ventilation	There is no scope for changing the windows.
Provide mechanical ventilation	The existing mechanical ventilation system will be retained.
Provide active cooling	It is proposed to replace the existing DX comfort cooling system with new more efficient systems.

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.

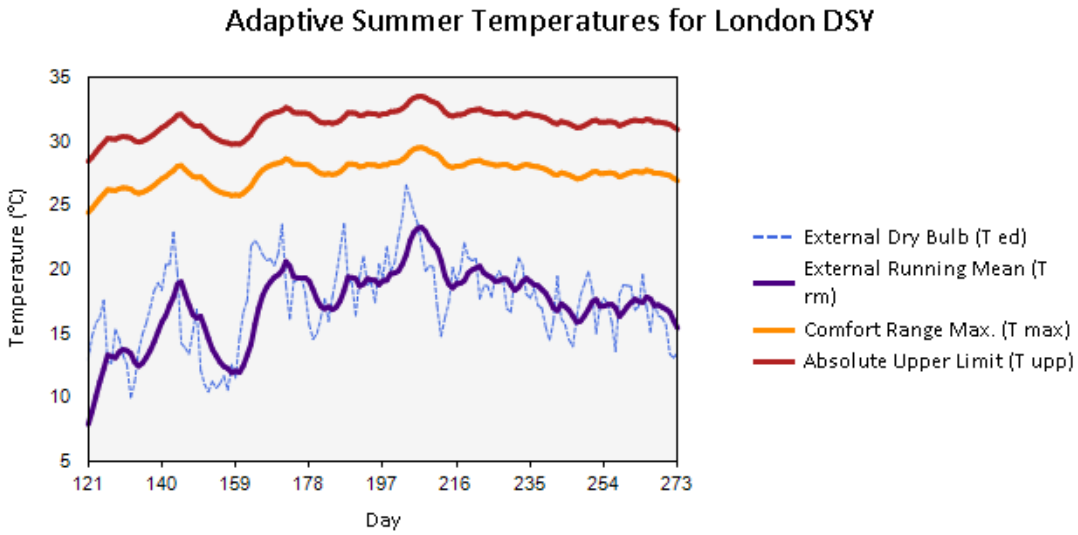


Figure 1.3: Temperature Threshold Range for London

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

All Offices and Ancillary Accommodation are served by an existing supply and extract ventilation system which is to be reconfigured to suit the new accommodation.

Fresh air provision is based on occupancy.

The results of the overheating assessment are recorded in *Figure 2.4*, 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
Collaborative space 49.8 sqm	1530	45	1137	26.0	75	Fail
Collaborative space 5.1 sqm	1530	45	1421	27.0	304	Fail
Agile office space 65 sqm	1530	45	1398	27.0	70	Fail
Meeting room 01 10 sqm	1530	45	1260	26.0	1	Fail
Meeting room 03 5.8 sqm	1530	45	1225	25.0	25	Fail
Meeting room 02 19 sqm	1530	45	988	25.0	0	Fail

Figure 2.4

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 Meeting Room 02 complies with Criterion 3, Criterion 1 and Criterion 2 were not met in any of 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.