Integration

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25 Old Gloucester Street
Overheating Analysis (TM52)

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Document status

Project no	Project	Client	In conjunction with:
773	25 Gloucester Street, London WC1N 3AF	Box Associates Limited Thompson House 42-44 Dolben Street London SE1 0UQ	ATP Group Brook House Coventry Road Ilford Essex IG1 4QR

Revision	Date	Status	Prepared by	Checked by
—	14.03.24	Issue	Natasha Sidhu	Alan Harries

Contents

1 Executive Summary

This Overheating Analysis has been prepared by Integration Consultancy Limited in support of the full planning application for the proposed development at 25 Old Gloucester Road in Camden, London. This includes an extension to provide office accommodate and the conversion of front part of building at second and third floor levels to create 2 x studio dwellings.

The analysis follows the industry standard CIBSE Technical Memorandum TM52 methodology. This requires the creation of a 3D dynamic thermal model of the proposed residential and commercial areas of the development as well as relevant shadow casters.

Commercial overheating is considered to occur if an occupied room fails two or more criteria:

- **Criteria 1 – Annual Overheating Hours.**

  3% of occupied hours the operative temperature exceeds the threshold comfort temperature (upper limit of the range of comfort temperature) by 1°C from 1st May to 30th September.

- **Criteria 2 – Daily Temperature Exceedance**

  To allow for the severity of overheating, the weighted exceedance shall be less than or equal to 6 in any one day. For example, the operative temperature exceeds the threshold comfort temperature by 2°C over 4 hours in one day then that area would fail (as 2 x 4 = 8).

- **Criteria 3 – Overheating Temperature Maximum Limit**

  An absolute maximum value for the indoor operative temperature which shall not exceed the threshold comfort temperature by more than 4°C.

The commercial area benefits from a low glazing ratio, solar control glazing (g-value of 0.4), no south facing glazing, openable windows to provide cross flow ventilation and very efficient lights to limit internal heat gains.

The results from for the commercial study are given below.

The initial simulation (case 1) showed that the development did not pass the CIBSE TM52 overheating criteria based on a window g-value of 0.4 and very efficient lights 120lm/W.

A second case (case 2) was performed to test the effect of reducing solar gains further by using a very low g-value of 0.3. This case also fails. The case shows that solar gains are already being managed effectively.

A third case used active cooling in order to effectively deal with the internal gains and allows the scheme to pass the standard.

Case Study	Criteria 1 – Annual Overheating Hours	Criteria 2 – Daily Temp Exceedance	Criteria 3 – Overheating Max Limit	Pass/Fail
	(3% or less)	(6°C.Hrs or less)	(4°C or less)	Pass 2 out of 3
Case 1 Office with 0.4 g-value	4.9	21	5	Fail
Case 2 Office with 0.3 g-value	4.4	20	5	Fail
Case 3 Office with active cooling	0	0	0	Pass

Table 1: Commercial overheating analysis results

2 Introduction

Integration Consultancy Limited have been appointed to undertake an Overheating Analysis in support of the full planning application for the proposed development at 25 Old Gloucester Road in Camden, London. This includes an extension to provide office accommodate and the conversion of front part of building at second and third floor levels to create 2 x studio dwellings.

The health and wellbeing impacts of overheating can be significant for occupants and this type of study becomes increasingly important in the context of climate change.

2.1 THE DEVELOPMENT SITE

The site is located at 25 Old Gloucester Street, London WC1N 3AF

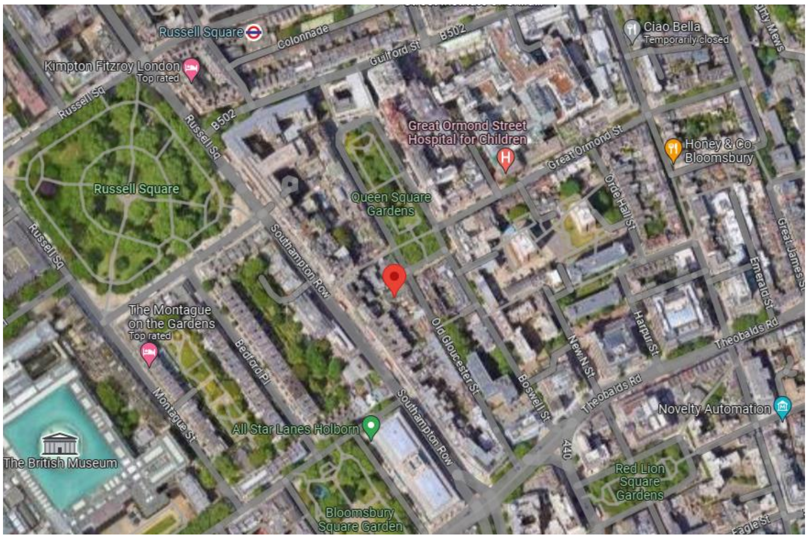

Figure 1: Site Location

2.2 PROPOSED DEVELOPMENT OVERVIEW

This includes an extension of basement to accommodate additional cultural centre accommodation (use class F1 and F2), replacement of second floor at rear to accommodate offices (class E1) and conversion of front part of building at second and third floor levels to create 2 x studio dwellings.

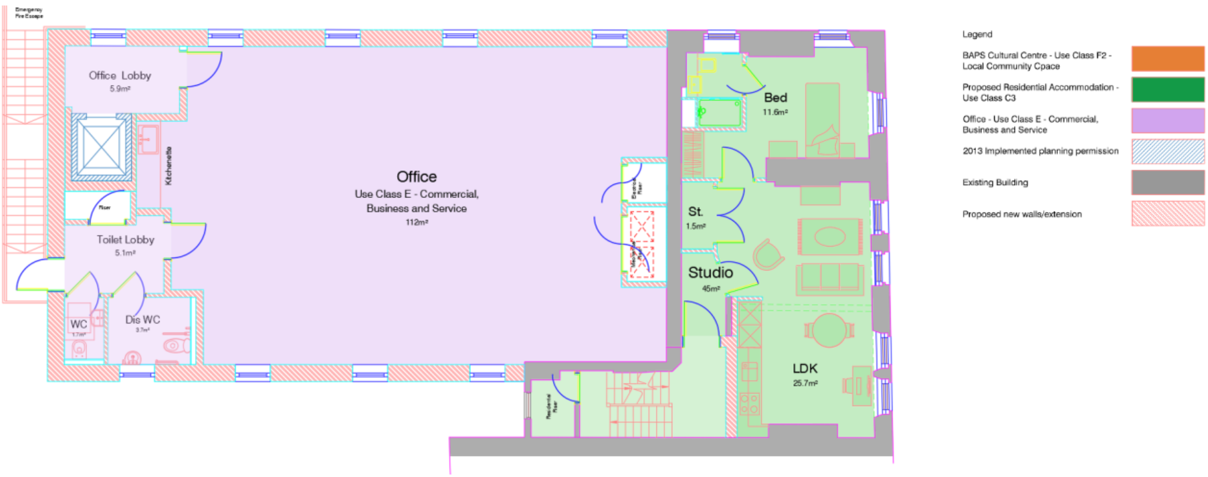

Figure 2: Proposed development – second floor new build office extension

2.3 CIBSE TM52 COMMERCIAL OVERHEATING CRITERIA

Non-residential overheating, in naturally ventilated areas, is considered to occur if an occupied room fails two or more criteria from the CIBSE TM52 overheating standard:

- **Criteria 1 – Annual Overheating Hours.**

  3% of occupied hours the operative temperature exceeds the threshold comfort temperature (upper limit of the range of comfort temperature) by 1°C from 1st May to 30th September.

- **Criteria 2 – Daily Temperature Exceedance**

  To allow for the severity of overheating, the weighted exceedance shall be less than or equal to 6 in any one day. For example, the operative temperature exceeds the threshold comfort temperature by 2°C over 4 hours in one day then that area would fail (as 2 x 4 = 8).

- **Criteria 3 – Overheating Temperature Maximum Limit**

  An absolute maximum value for the indoor operative temperature which shall not exceed the threshold comfort temperature by more than 4°C.

3 Planning Policy

3.1 LONDON PLAN

Cooling and overheating policy is set out in The London Plan 2021 as given below. This policy requires that proposals demonstrate how the design of the development would minimise overheating and the energy use from air conditioning systems as much as possible.

Policy SI 4 states that development proposals should reduce potential overheating and reliance on air conditioning systems in accordance with the six step “cooling hierarchy” shown below. The cooling hierarchy for this scheme is presented in the sustainability statement.

3.2 POLICY SI 4 MANAGING HEAT RISK

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

B 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.

9.4.5 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

3.3 CAMDEN LOCAL POLICY

The Local Plan was adopted by Council on 3 July 2017. It replaced the Core Strategy and Camden Development Policies as the basis for planning decisions and future development in Camden. Within ‘Section 8: Sustainability and climate change’ the policy discusses the importance of overheating; this is reproduced below.

8.41 Cooling. All new developments will be expected to submit a statement demonstrating how the London Plan’s ‘cooling hierarchy’ has informed the building design. Any development that is likely to be at risk of overheating (for example due to large expanses of south or south west facing glazing) will be required to complete dynamic thermal modelling to demonstrate that any risk of overheating has been mitigated.

8.42 Active cooling (air conditioning) will only be permitted where dynamic thermal modelling demonstrates there is a clear need for it after all of the preferred measures are incorporated in line with the cooling hierarchy.

4 Thermal Model

The CIBSE Technical Memorandum TM52 methodology requires the creation of a 3D dynamic thermal model of the proposed development. The set-up is described below.

Software: IES VE PRO Engineer (2023)

Weather Data: CIBSE DSY (Design Summer Year) for London 2020 high emissions 50th percentile scenario.

TM59 Parameters: Building Category 2 (new build and refurbishment)

Sampling: The study considers the new build office accommodation.

Model Assumptions: Input values are presented in the tables below.

Geometry Data: Geometry is given below and is based on drawing as indicated the table below.

All areas modelled have been zoned into separate rooms including kitchen/living rooms, bedrooms, bathrooms and halls etc. Building construction are modelled as proposed and reflect thermal properties such as thermal mass, insulation and airtightness.

Internal doors are considered to be closed (which is the worst case scenario). TM59 states Internal doors can be included and left open in the model in the daytime, but should be assumed to be closed when the occupants are sleeping.

Drawing No (version)	Name	Source
23165_PL2.001	Proposed basement floor plan	ATP Group
23165_PL2.002	Proposed ground floor/ mezzanine plan	ATP Group
23165_PL2.003	Proposed first floor plan	ATP Group
23165_PL2.004	Proposed second floor plan	ATP Group
23165_PL2.005	Proposed third floor/ roof plan	ATP Group
23165_PL2.006	Proposed Section A-A	ATP Group
23165_PL2.007	Proposed Section B-B	ATP Group

Table 2: Drawings used for modelling

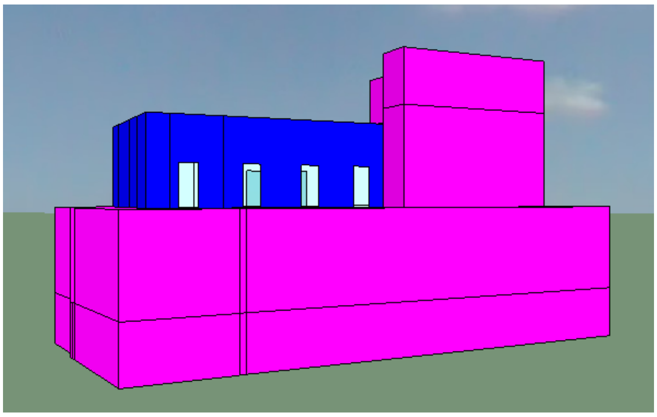

Figure 3: Model geometry

The building construction is summarised as follows:

Element	Inputs
External Walls	0.26 W/m²K
Roof	0.16 W/m²K
Windows	1.6 W/m²K (g value 0.4)
Air Tightness	5.0 m³/m²/h @50Pa

Table 3: Modelling assumptions

4.1.1 Opening Types

The commercial window types are summarised below:

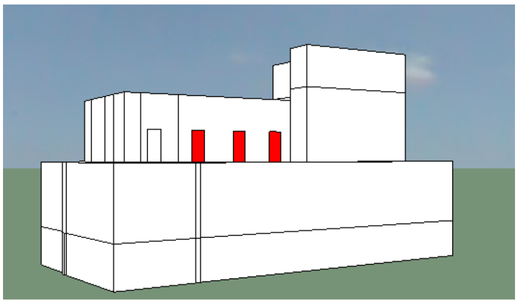

Figure 4: Commercial window Types – see table below. (East Elevation).

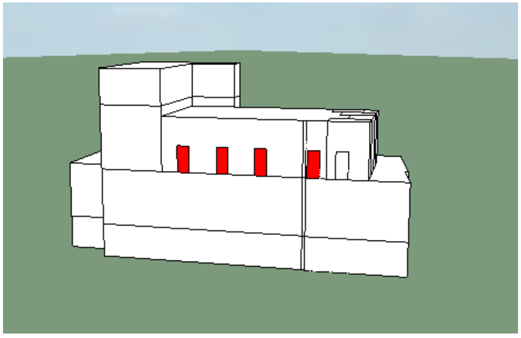

Figure 5: Commercial window Types – see table below. (Northwest Elevation).

Window Type	Description	Opening Area	Restrictions
Type 1 (RED)	Sash windows	50% openable	Openable during occupied hours

Table 4: Commercial window types

4.1.2 Occupancy and Equipment

The commercial occupancy and equipment gains are given below.

Unit/ room type	Occupancy load	Lighting load	Equipment load
Office	14 people from 9am-5pm	$2W/m^2$	$25W/m^2$

Table 5: Commercial occupancy and equipment gains assumptions

5 Model Results

5.1 COMMERCIAL OVERHEATING RESULTS

The results from for the commercial study are given below.

The initial simulation (case 1) showed that the development did not pass the CIBSE TM52 overheating criteria based on a window g-value of 0.4 and very efficient lights 120lm/W.

A second case (case 2) was performed to test the effect of reducing solar gains further by using a very low g-value of 0.3. This case also fails. The case shows that solar gains are already being managed effectively.

A third case used active cooling in order to effectively deal with the internal gains and allows the scheme to pass the standard.

Case Name	Criteria 1 – Annual Overheating Hours	Criteria 2 – Daily Temp Exceedance	Criteria 3 – Overheating Max Limit	Pass/Fail
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Case 2 Office with 0.3 g-value	4.4	20	5	Fail
Case 3 Office with active cooling	0	0	0	Pass

Table 6: Commercial overheating analysis results for each unit (DSY 1)

6 Conclusions

The analysis follows the industry standard CIBSE Technical Memorandum TM52 methodologies. This requires the creation of a 3D dynamic thermal model of the proposed commercial areas of the development.

The commercial area benefits from a low glazing ratio, solar control glazing (g-value of 0.4), no south facing glazing, openable windows to provide cross flow ventilation and very efficient lights to limit internal heat gains.

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