Overheating Assessment

Ham Close Regeneration, Richmond

On behalf of Hill Residential

R03

Date: August 22

REVISION HISTORY

Revision	Issue Date	Description	Issued By	Checked By
R00	17/03/2022	First Issue	JA	TW
R01	29/03/2022	Updated with comments	JA	-
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Calculations contained within this report have been produced based on information supplied by the Client and the design team. Any alterations to the technical specification on which this report is based will invalidate its findings.

Energist London
4-12 Regent Street
London
SW1Y 4RG
Tel: 020 7129 8123

london@energistuk.co.uk
www.energist.co.uk

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EXECUTIVE SUMMARY

Energist UK has been instructed by Hill Residential ("the Applicant") to carry out an Overheating Assessment for the proposed regeneration of Ham Close, Ham, Richmond upon Thames, TW10 7PG ("the Proposed Development").

This Overheating Assessment outlines the passive and active design measures taken by the Applicant to ensure that the risk of overheating has been minimised and that the strategy:

- Aligns with the London Plan Policy SI 4 '*Managing heat risk'* and the cooling hierarchy
- Aligns with London Borough of Richmond upon Thames Local Plan (2018) Policy LP 20: Climate Change Adaption
- Addresses the requirements of the Greater London Authority (GLA's) Guidance on Preparing Energy Assessments (2020)
- Follows the methodology set out in CIBSE TM52 and TM59 and complies with the overheating criteria.

This assessment has been based on a sample of 23no. representative residential dwellings, which have been selected to be assessed based on a worst-case scenario, and a sample of corridors. The non-domestic assessment has been based on the Community Centre and Maker Labs buildings.

The Applicant incorporates the following passive and active design measures, in accordance with the London Plan cooling hierarchy, to address and successfully mitigate the risk of overheating:

- Improved Building Fabric
- Natural Ventilation through Fully Openable Windows
- Mechanical Ventilation with Heat Recovery (MVHR) in all habitable rooms
- Balconies and overhangs which can create shading
- Comfort cooling within non-domestic spaces.

The Applicant takes full account of a requirement to adapt to, and mitigate for, the impact of climate change and has taken steps to ensure this is considered within the design of the proposed scheme.

The results show that all assessed dwellings and non-domestic areas comply with the requirements of the CIBSE TM59 and TM52 methodologies, respectively.

Table 1 – Summary of the CIBSE TM52/59 Overheating Assessment results

Reference	Type	Block	Storey	CIBSE TM52/TM59 Results
A-3-3	Apartment	A	3	PASS
C-5-3	Apartment	C	5	PASS
C-5-4	Apartment	C	5	PASS
E-5-2	Apartment	E	5	PASS
E-5-3	Apartment	E	5	PASS
M-5-1	Apartment	M	5	PASS
M-5-3	Apartment	M	5	PASS
M-5-4	Apartment	M	5	PASS
N-3-5	Apartment	N	3	PASS
O-3-3	Apartment	O	3	PASS
R-4-2	Apartment	R	4	PASS
R-4-3	Apartment	R	4	PASS
T-3-4	Apartment	T	3	PASS
U-3-4	Apartment	U	3	PASS
V-5-4	Apartment	V	5	PASS
V-5-5	Apartment	V	5	PASS
W-3-1	Apartment	W	3	PASS
W-3-2	Apartment	W	3	PASS
G-1	House	G	-	PASS
G-2	House	G	-	PASS
J-1	House	J	-	PASS
P-1	House	P	-	PASS
P-2	House	P	-	PASS
C-C-X	Corridor	C	0-5	PASS
M-C-X	Corridor	M	0-5	PASS
Community Centre	Non-domestic	-	0-2	PASS
Maker Labs	Non-domestic	-	0-1	PASS

1. INTRODUCTION

Overheating has become a Common Issue in recent years due to climate change and stricter national and regional policies for energy efficient buildings, improved building fabrics and airtight buildings. Furthermore, in urban centres, especially in the South and Southeast of the UK, the Urban Heat Island effect is deteriorating the consequences of the already intense and frequent hot summer events to the building industry.

Therefore, it becomes of significant importance to assess the risk of overheating at the early stages of the design process to avoid any expensive modifications to the design at later stages of the Development process. This Overheating Assessment has been prepared by Energist UK Ltd. for the domestic and non-domestic elements of the proposed regeneration of Ham Close, Ham, Richmond upon Thames, TW10 7PG (" the Proposed Development").

This report presents how the Proposed Development aligns with the requirements of national and regional planning policies related to overheating, described in Appendix 2. It follows the steps proposed by the CIBSE TM52 guidance '*The limits of thermal comfort: avoiding overheating in European buildings'*, and the CIBSE TM59 guidance '*Design methodology for the assessment of overheating risk in homes*' and is aligned to the cooling hierarchy set out in the London Plan Policy SI 4 '*Managing heat risk*'. For this assessment, the IES Virtual Environment software (2021) has been used. A representative number of dwellings and the non-domestic areas have been modelled and the risk of overheating assessed.

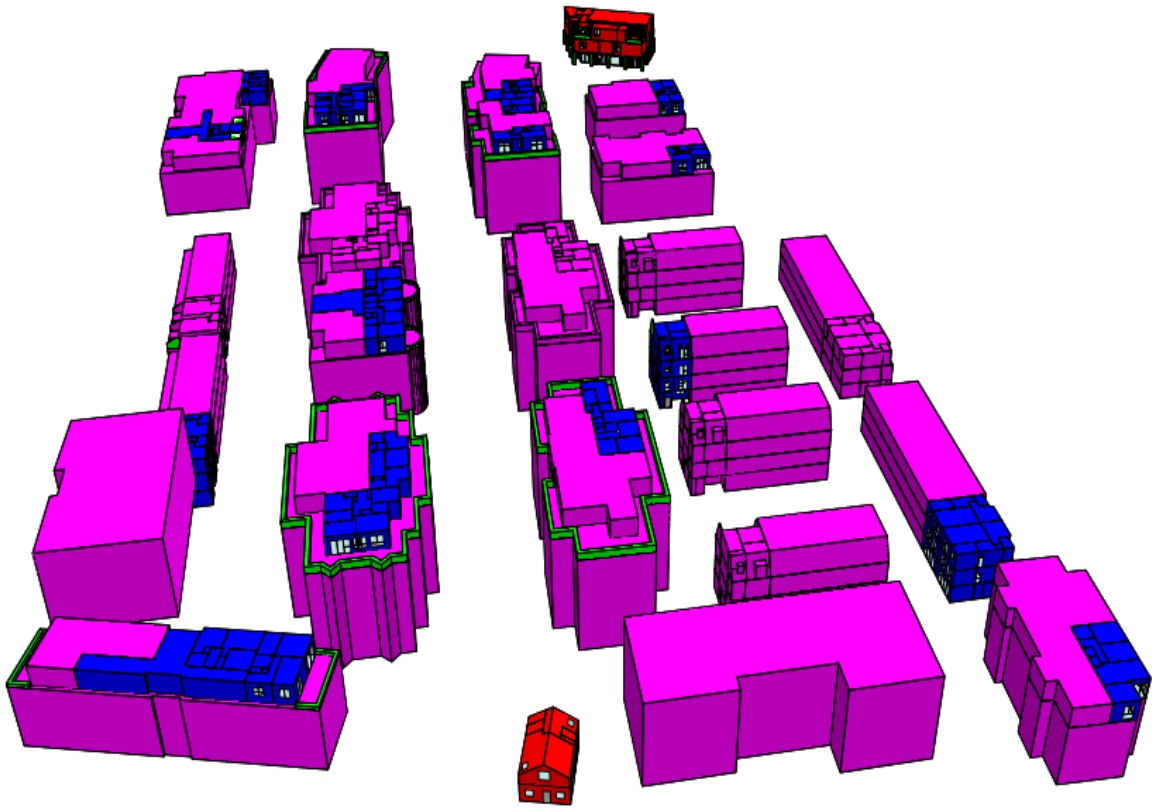

Figure 1 - IES VE model view of assessed dwellings (blue) and non-domestic areas (red)

2. DEVELOPMENT OVERVIEW

This Overheating Assessment has been produced for the proposed regeneration of Ham Close, Ham, Richmond upon Thames, TW10 7PG. A Full Detailed Planning Application is being submitted to the London Borough of Richmond upon Thames.

The site is located on Ham Close, between St Richard's CE Primary School and Ham Street/Wiggins Lane, in a predominantly residential setting. The site is an existing Richmond Housing Partnership (RHP) owned estate, with 6 small parcels of land owned by the London Borough of Richmond Upon Thames. An agreement is in place for RHP to purchase the parcels to enlarge the development site. The site has 14 existing residential blocks, plus some ancillary uses including garages. The site is allocated in the local plan for redevelopment.

The proposed regeneration consists of the demolition of existing buildings on-site and phased mixed-use development comprising 452 residential homes (Class C3) up to six storeys; a Community/Leisure Facility (Class F2) of up to 3 storeys in height, a “Maker Labs” (sui generis) of up to 2 storeys together with basement car parking and site wide landscaping.

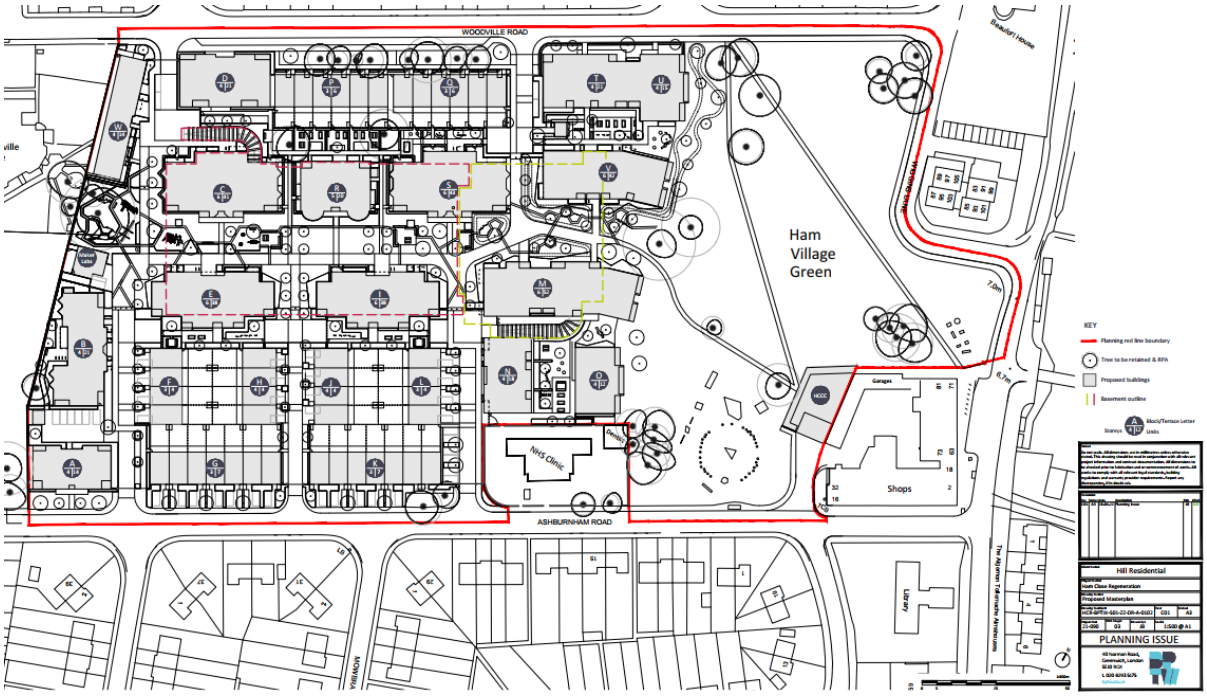

Figure 2 – Masterplan providing an overview of the site layout (BPTW drawing HCR-BPTW-S01-ZZ-DR-A-0102-C01)

3. ASSESSMENT METHODOLOGY AND INPUTS

CIBSE TM59 Criteria

CIBSE TM59 '*Design methodology for the assessment of overheating risk in homes (2017)*' introduces two sets of compliance criteria for assessing overheating which are based on the ventilation type of the dwelling:

For houses predominantly naturally ventilated

a) The number of hours for living rooms, kitchens and bedrooms, for which the difference between the internal and external temperatures (ΔT) is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 per cent of the occupied hours (TM52 criterion 1).
b) For bedrooms only, to guarantee comfort during the sleeping hours the operative temperature from 10pm to 7am shall not exceed 26°C for more than 1 per cent of annual hours (i.e. 32 hours, so 33 or more hours above 26°C will be recorded as a fail). Criteria 2 and 3 of CIBSE TM52 may fail to be met, but both a and b above must be met.

For homes predominantly mechanically ventilated

a) (for example, because of air quality or noise issues), the CIBSE Guide A fixed temperature test must be followed, i.e. all occupied rooms should not exceed an operative temperature of 26 °C for more than 3 per cent of the annual occupied hours.

The assessed residential dwellings are predominantly naturally ventilated. Therefore, they have been assessed against Criteria a and b of predominantly naturally ventilated houses.

Additionally, corridors should demonstrate that an operative temperature of 28°C should not be exceeded for more than 3% of the total annual hours.

CIBSE TM52 Criteria

For non-domestic areas occupied spaces must comply with the requirements of CIBSE TM52: '*The limits of thermal comfort: avoiding overheating in European buildings (2013)*', and meet the following criteria:

- Criterion 1: Hours of exceedance (H_e): The number of hours (H_e) during which ΔT is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 per cent of occupied hours.
- Criterion 2: Daily weighted exceedance (W_e): To allow for the severity of overheating the weighted exceedance (W_e) shall be less than or equal to 6 in any one day.
- Criterion 3: Upper limit temperature (T_{upp}): To set an absolute maximum value for the indoor operative temperature the value of ΔT shall not exceed 4 degrees (K).

A room or building that fails any two of the three criteria is classed as overheating.

Sample Size

For the purpose of this Overheating Assessment a sample of 23no. dwellings have been selected for assessment, as well as a sample of corridors. The selection of the dwellings has been based on the criteria set by CIBSE TM59 for dwellings being at high risk of overheating. These are likely to be dwellings:

a. on the topmost floor,
b. with large glazing areas,
c. having less shading,
d. having large, sun facing windows,
e. having a single aspect,
f. having limited opening windows.

The non-domestic Overheating Assessment has been based on the Community Centre and Maker Labs.

Simulation Weather Data

For the assessment of the risk of overheating the CIBSE Design Weather Year (DSY1) for the 2020s, high emissions, 50% percentile scenario has been used as required in the CIBSE TM59 methodology.

The site is located in a suburban area and therefore the London Heathrow DSY1 has been selected as the most appropriate location.

In accordance with London plan Policy SI 4 '*Managing heat risk*', the Proposed Development shall also be assessed against the CIBSE TM49 '*Design Summer Years for London*' weather files, however it is acknowledged that meeting the compliance criteria is challenging for the more extreme weather files. These are namely:

- DSY1 – 2020s, high emissions, 50% percentile scenario
- DSY2 – 2003: a year with a very intense single warm spell, high emissions, 50% percentile scenario
- DSY3 – 1976: a year with a prolonged period of sustained warmth, high emissions, 50% percentile scenario.

Building Fabric Specification

The Proposed Development incorporates passive measures as part of the Energy Strategy and aligns with the cooling hierarchy of the London Plan.

A summary of the design specification for Ham Close is provided below.

Table 2 - Proposed 'Be Lean' fabric specification

Element	'Be Lean' Design Specification
Ground Floor U-Value (W/m^2.K)	Domestic: 0.10 Non-domestic: 0.12
External Wall U-Value (W/m^2.K)	Domestic: 0.16 Non-domestic: 0.15
Party Wall U-Value (W/m^2.K)	Domestic: 0 (fully filled and sealed)

Roof (Flat) U-Value (W/m^2.K)	Domestic: 0.10 Non-domestic: 0.12
Door U-Value (W/m^2.K)	Domestic: 1.0 Non-domestic: 1.2
Glazing U-Value (W/m^2.K)	Domestic: 1.2 (double-glazed units) Non-domestic: 1.1
Glazing G-Value	0.5
Design Air Permeability	Domestic: 4 Non-domestic: 3
Thermal Bridging	Bespoke PSI values

Internal Gains

Occupancy Gains

For residential areas occupancy maximum sensible and latent gains should be equal to 75W/person and 55W/person in all living spaces.
For communal corridors since they cannot be considered as living spaces, the occupancy gains are assumed to be equal to zero.

A summary of the occupancy gains as required by CIBSE TM59 are provided in Appendix 3.

For non-domestic areas the following occupancy gains have been assumed, based on CIBSE Guide A.

Table 3 - Non-domestic occupancy gains

Reference	Maximum Sensible Occupancy Gain (W/person)	Maximum Latent Occupancy Gain (W/person)	Occupancy Density
Lounge/workshop/meeting rooms	90	60	12m^2 / person
Toilets	90	60	1 person

Lighting Gains

For residential areas internal gains due to lighting for the purposes of this assessment have been assumed to be equal to 2 W/m^2 and will be operating from 6pm till 11pm.

For communal corridors, the same value should be assumed unless lighting is controlled by PIR sensors where it should be assumed to be 0W/m^2.

For non-domestic areas lighting gains have been based on a lighting design of 5W/m^2 sensible heat gain. Lighting operation has been assumed to be between 9am to 5pm.

Equipment Gains

For residential areas equipment gains should be assumed to be equal to the values provided in CIBSE TM59. Further details for equipment gain values and hours of operation for each living space can be found in Appendix 4.

For non-domestic areas the following equipment gains have been assumed, based on CIBSE Guide A.

Table 4 - Non-domestic equipment gains

Reference	Maximum Sensible Equipment Gain (W/m^2)
Lounge/meeting rooms	5
Workshops/ICT Room/Kitchenette	15
IT Cupboard	200

Ventilation

Natural Ventilation

All assessed dwellings in are considered to be predominantly naturally ventilated.

All openable windows have been set to be fully openable when the internal dry bulb temperature is equal or greater than 22ºC and when the internal temperature is lower than the external temperature. Windows have been assumed to open on restrictors during night-time when rooms are un-occupied to allow nighttime purge ventilation. Windows have been set to open to 30 degrees, with balcony doors open to 90 degrees.

Non-domestic areas have been modelled with openable windows where they have been identified on Architectural elevation drawings. The opening times have been limited to operation hours of the building, which have been assumed to be 9am-5pm. Windows have been set to open to 30 degrees, with balcony doors open to 90 degrees.

All spaces have been modelled without the use of blinds in order to ascertain a worst case scenario. However, the use of blinds may be an appropriate occupant control measure for the effects of future climate change (refer to Appendix 5).

Mechanical Ventilation

All residential dwellings and non-domestic areas have been specified with Mechanical Ventilation with Heat Recovery Systems (MVHR) in all habitable rooms.

The supply and extract rates for residential dwellings are based on the Approved Document Part F minimum continuous flow rates. The ventilation rates for non-domestic areas has been based on 10l/s/person in accordance with CIBSE Guide A.

Corridors

The proposed Energy Strategy is based on Energy Centres served by Air Source Heat Pumps, with Heat Interface Units within each Apartment. To account for heat gains within corridors and risers, the default CIBSE TM59 heat gains have been assumed, based on 14.12 W/m run of pipe.

Heat build-up within the communal corridors shall be treated via the AOV or natural vents operating via wall mounted thermostats. These have been set to operate when the internal temperature exceeds 24ºC.

4. SIMULATION RESULTS

The following section presents and analyses the results of the Overheating Assessment for the Proposed Development at Ham Close.

As required by the CIBSE TM52 and TM59 methodology the modelled air speed has been set at 0.1m/s.

Domestic and Corridor Overheating Results

In accordance with criteria a of CIBSE TM59, the number of hours for living rooms, kitchens and bedrooms, for which the difference between the internal and external temperatures (ΔT) is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 per cent of the occupied hours. This is assessed against criterion 1 of CIBSE TM52. Criteria 2 and 3 of CIBSE TM52 may fail to be met.

In accordance with criteria b of CIBSE TM59, for bedrooms only, to guarantee comfort during the sleeping hours the operative temperature from 10pm to 7am shall not exceed 26°C for more than 1 per cent of annual hours (i.e. 33 or more hours above 26°C will be recorded as a fail).

Additionally, corridors should demonstrate that an operative temperature of 28°C should not be exceeded for more than 3% of the total annual hours.

The results below indicate that all assessed living spaces comply with Criterion 1 of CIBSE TM52 (i.e. CIBSE TM59 Criteria a), and that all assessed bedrooms do not exceed 26ºC for more than 1% of the annual hours from 10pm to 7am. None of the assessed corridors were shown to exceed 28°C for more than 3% of annual hours.

Table 5 - Summary of all assessed living spaces and bedrooms against CIBSE TM59 criteria a and b, using DSY1 weather file

Reference	CIBSE TM 59 Criteria a (≤ 3%)	CIBSE TM59 Criteria b (≤ 1%)	CIBSE TM59 Compliance
A-3-3_Bedroom 1	0	0.52	PASS
A-3-3_Bedroom 2	0.2	0.52	PASS
A-3-3_Kitchen	2.1	-	PASS
A-3-3_Living Room	1.4	-	PASS
C-5-3_Bedroom 1	0	0.52	PASS
C-5-3_Bedroom 2	0.1	0.55	PASS
C-5-3_Kitchen	0	-	PASS
C-5-3_Living Room	0.1	-	PASS
C-5-4_Bedroom 1	0.1	0.43	PASS
C-5-4_Bedroom 2	0	0.37	PASS
C-5-4_Bedroom 3	0.2	0.40	PASS
C-5-4_Kitchen	2.8	-	PASS
C-5-4_Living Room	3	-	PASS
E-5-2_Bedroom 1	0.5	0.46	PASS
E-5-2_Kitchen	1.1	-	PASS
E-5-2_Living Room	2.1	-	PASS
E-5-3_Bedroom 1	0.4	0.58	PASS
E-5-3_Kitchen	0	-	PASS
E-5-3_Living Room	0	-	PASS
M-5-1_Bedroom 1	1.5	0.43	PASS
M-5-1_Kitchen	1	-	PASS
M-5-1_Living Room	1.2	-	PASS
M-5-3_Bedroom 1	0.2	0.52	PASS
M-5-3_Kitchen	0	-	PASS
M-5-3_Living Room	0	-	PASS
M-5-4_Bedroom 1	0	0.43	PASS
M-5-4_Bedroom 2	0	0.43	PASS
M-5-4_Bedroom 3	0	0.43	PASS
M-5-4_Kitchen	0	-	PASS
M-5-4_Living Room	0	-	PASS
N-3-5_Bedroom 1	0.2	0.49	PASS
N-3-5_Kitchen	0.4	-	PASS
N-3-5_Living Room	0.6	-	PASS
O-3-3_Bedroom 1	0	0.40	PASS
O-3-3_Bedroom 2	0	0.40	PASS
O-3-3_Kitchen	0	-	PASS
O-3-3_Living Room	0	-	PASS
R-4-2_Bedroom 1	0	0.46	PASS
R-4-2_Bedroom 2	0	0.49	PASS
R-4-2_Kitchen	0	-	PASS
R-4-2_Living Room	0	-	PASS
R-4-3_Bedroom 1	0	0.49	PASS

R-4-3_Bedroom 2	0	0.49	PASS
R-4-3_Kitchen	0.1	-	PASS
R-4-3_Living Room	0.1	-	PASS
T-3-4_Bedroom 1	0	0.30	PASS
T-3-4_Kitchen	0	-	PASS
T-3-4_Living Room	0	-	PASS
U-3-4_Bedroom 1	0	0.46	PASS
U-3-4_Bedroom 2	0	0.46	PASS
U-3-4_Kitchen	0	-	PASS
U-3-4_Living Room	0	-	PASS
V-5-4_Bedroom 1	0.2	0.37	PASS
V-5-4_Kitchen	0.2	-	PASS
V-5-4_Living Room	0.4	-	PASS
V-5-5_Bedroom 1	0	0.37	PASS
V-5-5_Bedroom 2	0.2	0.33	PASS
V-5-5_Bedroom 3	0	0.37	PASS
V-5-5_Kitchen	0.9	-	PASS
V-5-5_Living Room	2.5	-	PASS
W-3-1_Bedroom 1	0.3	0.40	PASS
W-3-1_Kitchen	0.2	-	PASS
W-3-1_Living Room	0.2	-	PASS
W-3-2_Bedroom 1	0	0.37	PASS
W-3-2_Kitchen	0	-	PASS
W-3-2_Living Room	0	-	PASS
G-1-0_Kitchen	0.5	-	PASS
G-1-0_Living Room	1	-	PASS
G-1-1_Bedroom 1	0.6	0.46	PASS
G-1-1_Bedroom 2	0.5	0.49	PASS
G-1-1_Living Room	1.3	-	PASS
G-1-2_Bedroom 3	0	0.21	PASS
G-1-2_Bedroom 4	0	0.24	PASS
G-2-0_Kitchen	0.4	-	PASS
G-2-0_Living Room	0.8	-	PASS
G-2-1_Bedroom 1	0.5	0.43	PASS
G-2-1_Bedroom 2	0.5	0.37	PASS
G-2-1_Living Room	0.8	-	PASS
G-2-2_Bedroom 3	0	0.21	PASS
G-2-2_Bedroom 4	0	0.21	PASS
J-1-0_Kitchen	0.7	-	PASS
J-1-0_Living Room	1	-	PASS
J-1-1_Bedroom 1	0.9	0.46	PASS
J-1-1_Bedroom 2	0.9	0.40	PASS
J-1-1_Living Room	0.9	-	PASS
J-1-2_Bedroom 3	0	0.24	PASS
J-1-2_Bedroom 4	0.1	0.37	PASS
J-1-3_Bedroom 5	0	0.27	PASS
J-1-3_Living Room	0	-	PASS

P-1-0_Kitchen	0.8	-	PASS
P-1-0_Living Room	1.3	-	PASS
P-1-1_Bedroom 1	0.3	0.43	PASS
P-1-1_Bedroom 2	0.1	0.37	PASS
P-1-1_Bedroom 3	0.1	0.33	PASS
P-1-2_Bedroom 4	0	0.24	PASS
P-2-0_Kitchen	0.8	-	PASS
P-2-0_Living Room	1.4	-	PASS
P-2-1_Bedroom 1	0	0.33	PASS
P-2-1_Bedroom 2	0	0.33	PASS
P-2-1_Bedroom 3	0	0.30	PASS
P-2-2_Bedroom 4	0	0.21	PASS

Table 6 - Summary of all assessed corridors against CIBSE TM59 criteria, using DSY1 weather file

Reference	CIBSE TM 59 Hrs > 28°C	CIBSE TM59 Compliance
C-C-0_Corridor 1	0	PASS
C-C-0_Corridor 2	0.1	PASS
C-C-1_Corridor 1	0.2	PASS
C-C-1_Corridor 2	0	PASS
C-C-2_Corridor 1	0.9	PASS
C-C-2_Corridor 2	0	PASS
C-C-3_Corridor 1	1.8	PASS
C-C-3_Corridor 2	0	PASS
C-C-4_Corridor 1	2.6	PASS
C-C-4_Corridor 2	0	PASS
C-C-5_Corridor 1	1.8	PASS
C-C-5_Corridor 2	0.1	PASS
M-C-0_Corridor 1	0.4	PASS
M-C-0_Corridor 2	0	PASS
M-C-0_Corridor 3	0.3	PASS
M-C-1_Corridor 1	0.4	PASS
M-C-1_Corridor 2	0	PASS
M-C-2_Corridor 1	0.5	PASS
M-C-2_Corridor 2	0	PASS
M-C-3_Corridor 1	1.1	PASS
M-C-3_Corridor 2	0.4	PASS
M-C-4_Corridor 1	1.4	PASS
M-C-4_Corridor 2	1.7	PASS
M-C-5_Corridor 1	1.2	PASS
M-C-5_Corridor 2	1.5	PASS

Non-domestic Overheating Results

Occupied spaces must comply with the requirements of CIBSE TM52 and meet the following criteria:

- Criterion 1: Hours of exceedance (H_e): The number of hours (H_e) during which ΔT is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 per cent of occupied hours.
- Criterion 2: Daily weighted exceedance (W_e): To allow for the severity of overheating the weighted exceedance (W_e) shall be less than or equal to 6 in any one day.
- Criterion 3: Upper limit temperature (T_{upp}): To set an absolute maximum value for the indoor operative temperature the value of ΔT shall not exceed 4 K.

A room or building that fails any two of the three criteria is classed as overheating.

The non-domestic areas have been assessed following the cooling hierarchy, with initial simulations conducted with a passive natural ventilation strategy. The CIBSE TM52 results demonstrate failure to comply with the relevant criteria. Due to the large glazing requirement for public and non-domestic buildings, which benefits lighting loads and energy reduction, and the inability to leave windows open to purge heat during the nighttime, the Design Team have proposed cooling via MVHR and VRF systems. This strategy achieves comfort cooling and creates a comfortable environment for the buildings' occupants. Cooling set points for occupied spaces has been set to 22°C in accordance with the CIBSE Guide A recommendations. Following the introduction of comfort cooling, in line with the London Plan cooling hierarchy, the non-domestic areas are compliant with CIBSE TM52 criteria.

Table 7 – Summary of CIBSE TM52 Results for Occupied Spaces, Passive Natural Ventilation Design, using DSY1 weather file

Reference	Criterion 1 Hours >ΔT	Criterion 2 $W_e \leq 6$	Criterion 3 ΔT ≤ 4 K	CIBSE TM52 Compliance
Community Centre_00_Community Lounge	6.2	18	5	FAIL
Community Centre_00_Loft/Kitchen	3.1	14	3	FAIL
Community Centre_00_Reception	10.7	22	6	FAIL
Community Centre_01_Activity Hall	1.5	8	2	PASS
Community Centre_01_ICT Room	5.1	19	5	FAIL
Community Centre_01_Meeting Room	1.5	8	2	PASS

Community Centre_01_Sensory Room	3.2	11	4	FAIL
Community Centre_02_Art Room	6.3	21	5	FAIL
Community Centre_02_Meeting Room	6.7	22	4	FAIL
Community Centre_02_Music Studio 1	2	12	3	PASS
Community Centre_02_Musci Studio 2	1.7	9	2	PASS
Makers Lab_00_Kitchenette	5.3	22	5	FAIL
Makers Lab_00_Workshop	4.3	23	5	FAIL
Makers Lab_01_Workshop	12.2	38	6	FAIL

Table 8 - Summary of CIBSE TM52 Results for Occupied Spaces, Comfort Cooling Design, using DSY1 weather file

Reference	Criterion 1 Hours >ΔT	Criterion 2 $W_e \leq 6$	Criterion 3 $\Delta T \leq 4$ K	CIBSE TM52 Compliance
Community Centre_00_Community Lounge	0	0	0	PASS
Community Centre_00_Loft/Kitchen	0	0	0	PASS
Community Centre_00_Reception	0	0	0	PASS
Community Centre_01_Activity Hall	0	0	0	PASS
Community Centre_01_ICT Room	0	0	0	PASS
Community Centre_01_Meeting Room	0	0	0	PASS
Community Centre_01_Sensory Room	0	0	0	PASS
Community Centre_02_Art Room	0	0	0	PASS
Community Centre_02_Meeting Room	0	0	0	PASS
Community Centre_02_Music Studio 1	0	0	0	PASS
Community Centre_02_Musci Studio 2	0	0	0	PASS
Makers Lab_00_Kitchenette	0	0	0	PASS
Makers Lab_00_Workshop	0	0	0	PASS
Makers Lab_01_Workshop	0	0	0	PASS

5. CONCLUSIONS AND RECOMMENDATIONS

This Overheating Assessment demonstrates that Ham Close regeneration successfully complies with:

- London Plan Policy SI 4 and the cooling hierarchy
- London Borough of Richmond upon Thames Local Plan (2018) Policy LP 20: Climate Change Adaption
- Greater London Authority (GLA's) Guidance on Preparing Energy Assessments (2020)
- Methodology as set out in CIBSE TM52 and TM59 and complies with the overheating criteria.

The Applicant incorporates the following passive and active design measures to address and successfully mitigate for the risk of overheating:

- Improved Building Fabric
- Natural Ventilation through Fully Openable Windows
- Mechanical Ventilation with Heat Recovery (MVHR) in all habitable rooms
- Balconies and overhangs which can create shading
- Comfort cooling within non-domestic spaces.

The Applicant takes full account of a requirement to adapt to, and mitigate for, the impact of climate change and has taken steps to ensure this is considered within the design of the proposed scheme.

All openable windows have been set to be fully openable when the internal dry bulb temperature is equal or greater than 22^{o}C and when the internal temperature is lower than the external temperature. Residential windows have been assumed to open on restrictors during night-time when rooms are un-occupied to allow nighttime purge ventilation. All spaces have been modelled without the use of blinds in order to ascertain a worst case scenario. However, the use of blinds may be an appropriate occupant control measure for the effects of future climate change (refer to Appendix 5).

The results show that all assessed dwellings and non-domestic areas comply with the requirements of the CIBSE TM59 and TM52 methodologies, respectively.

Table 9 – Summary of the CIBSE TM52/59 Overheating Assessment results

Reference	Type	Block	Storey	CIBSE TM52/TM59 Results
A-3-3	Apartment	A	3	PASS
C-5-3	Apartment	C	5	PASS
C-5-4	Apartment	C	5	PASS
E-5-2	Apartment	E	5	PASS
E-5-3	Apartment	E	5	PASS
M-5-1	Apartment	M	5	PASS
M-5-3	Apartment	M	5	PASS
M-5-4	Apartment	M	5	PASS
N-3-5	Apartment	N	3	PASS
O-3-3	Apartment	O	3	PASS
R-4-2	Apartment	R	4	PASS
R-4-3	Apartment	R	4	PASS
T-3-4	Apartment	T	3	PASS
U-3-4	Apartment	U	3	PASS
V-5-4	Apartment	V	5	PASS
V-5-5	Apartment	V	5	PASS
W-3-1	Apartment	W	3	PASS
W-3-2	Apartment	W	3	PASS
G-1	House	G	-	PASS
G-2	House	G	-	PASS
J-1	House	J	-	PASS
P-1	House	P	-	PASS
P-2	House	P	-	PASS
C-C-X	Corridor	C	0-5	PASS
M-C-X	Corridor	M	0-5	PASS
Community Centre	Non-domestic	-	0-2	PASS
Maker Labs	Non-domestic	-	0-1	PASS

APPENDICES

APPENDIX 1: LIST OF ABBREVIATIONS

CIBSE	Chartered Institute of Building Services Engineers
TM	Technical Memorandum
GLA	Greater London Authority
UHI	Urban Heat Island
IESVE	Integrated Environmental Solutions Virtual Environment
DSY	Design Summer Year
MEV	Mechanical Extract Ventilation
MVHR	Mechanical Ventilation with Heat Recovery
HIU	Heat Interface Unit
ASHP	Air Source Heat Pump
CHP	Combined Heat & Power
DHN	District Heat Network
DHW	Domestic Hot Water
GSHP	Ground Source Heat Pump
LPA	Local Planning Authority
SBEM	Simplified Building Energy Model
VRF	Variable Refrigerant Flow
AOV	Automatic Opening Vent

APPENDIX 2: PLANNING POLICY AND DESIGN GUIDANCE

The London Plan (March 2021)

Policy SI4 Managing Heat Risk:

Development proposals should minimise adverse impacts on the urban heat island 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.

Greater London's Authority (GLA's) Guidance on Preparing Energy Assessments

The Greater London Authority's (GLA's) Guidance on Preparing Energy Assessments provides further guidance for carrying out thermal modelling when assessing overheating.

The GLA's guidance suggests that dynamic thermal modelling should be provided in addition to any Part L Building Regulations compliance tools, i.e., SBEM or SAP and should be in line with the guidance provided in CIBSE TM49 in regard to the weather files used. That is, overheating modelling should be conducted using the following Design Summer Year (DSY) three weather files:

- **1976:** a year with a prolonged period of persistent warmth.
- **1989:** (current design year for London): moderately warm summer.
- **2003:** a year with a more intense single warm spell.

To accurately account for the geographical location of the proposed Development and the urban heat island effect at this specific location, the guidance suggests the selection amongst three weather locations for London:

- **London Heathrow Airport**, which represents a lower density urban/sub-urban location.
- **London Weather Centre**, which represents a central London location.
- **London Gatwick Airport**, which represents a rural location.

London Borough of Richmond upon Thames Adopted Local Plan (2018)

Policy LP 20

Climate Change Adaption

A. The Council will promote and encourage development to be fully resilient to the future impacts of climate change in order to minimise vulnerability of people and property.

B. New development, in their layout, design, construction, materials, landscaping and operation, should minimise the effects of overheating as well as minimise energy consumption in accordance with the following cooling hierarchy:

1. minimise internal heat generation through energy efficient design
2. reduce the amount of heat entering a building in summer through shading, reducing solar reflectance, fenestration, insulation and green roofs and walls
3. manage the heat within the building through exposed internal thermal mass and high ceilings
4. passive ventilation
5. mechanical ventilation
6. active cooling systems (ensuring they are the lowest carbon options).

C. Opportunities to adapt existing buildings, places and spaces to the likely effects of climate change should be maximised and will be supported.

CIBSE TM 52:2013 – The Limits of Thermal Comfort: Avoiding Overheating in European Buildings

The CIBSE TM52 guidance has been published in 2013 and uses the adaptive approach to assess whether a building will be overheating. TM52 uses the deviation from a set comfort temperature to assess whether a development is overheating.

CIBSE TM52 uses 3 criteria for assessing overheating. These are:

- **Criterion 1 – Hours of Exceedance (H_e):** The number of hours (H_e) during which ΔT 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.
  If data are not available for the whole period (or if occupancy is only for a part of the period) then 3 per cent of available hours should be used.

- **Criterion 2 – Daily Weighted Exceedance (W_e):** To allow for the severity of overheating the weighted exceedance (W_e) shall be less than or equal to 6 in any one day.

- **Criterion 3 – Upper Limit Temperature (T_{upp}):** To set an absolute maximum value for the indoor operative temperature the value of ΔT shall not exceed 4 K.

For a dwelling to be considered as overheating, it must be failing in 2 of the above criteria.

CIBSE TM 59:2017 - Design Methodology for the Assessment of Overheating Risk in Homes

In May 2017, the Chartered Institute of Building Services Engineers (CIBSE) published the Technical Memorandum TM59.

The new methodology is based on the use of dynamic thermal modelling for assessing the overheating risk in residential developments and should be especially considered for:

- Large developments.
- Developments in urban areas, particularly in Southern England.
- Blocks of flats.
- Dwellings with high levels of insulation and air tightness.
- Single aspect flats.

Developments assessed under TM59 methodology are required to pass using the DSY1 (current design summer year) weather file most appropriate to the site location, for the 2020s, high emissions, 50% percentile scenario.

Other extreme weather files (DSY2 and DSY3) as well as future weather files for climate change adaptation should be considered in buildings of particular concern (e.g. care homes) and/or where required in the client's brief.

TM59 introduces two sets of compliance criteria for assessing overheating which are based on the ventilation type of the dwelling. That is,

1. **For houses predominantly naturally ventilated**
   a. The number of hours for living rooms, kitchens and bedrooms, which ΔT is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 per cent of the occupied hours (TM52 criterion 1).

   b. For bedrooms only, to guarantee comfort during the sleeping hours the operative temperature from 10pm to 7am shall not exceed 26 degrees Celsius for more than 1 per cent of annual hours.

Criteria 2 and 3 of CIBSE TM52 may fail to be met, but both a and b above must be met.

2. **For homes predominantly mechanically ventilated** (for example because of air quality or noise issues), the CIBSE Guide A fixed temperature test must be followed, i.e. all occupied rooms should not exceed an operative temperature of 26 degrees Celsius for more than 3 per cent of the annual occupied hours.

APPENDIX 3: OCCUPANCY GAINS

Number of People	Description	Peak Load (W)		Hours of Occupancy	Percentage of load
		Sensible	Latent		
1	Single Bedroom	75	55	23:00 – 08:00	0.7
				08:00 - 23:00	1
2	Double Bedroom	150	110	23:00 – 08:00	0.7
				08:00 – 09:00	1
				09:00 – 22:00	0.5
				22:00 – 23:00	1
1	1 Bed – Living Room/Kitchen	75	110	09:00 – 22:00	1
	1 Bed – Living Room			09:00 – 22:00	0.75
	1 Bed - Kitchen			09:00 – 22:00	0.25
2	2 Bed – Living Room/Kitchen	150	110	09:00 – 22:00	1
	2 Bed – Living Room			09:00 – 22:00	0.75
	2 Bed – Kitchen			09:00 – 22:00	0.25
3	3 Bed – Living/Kitchen	225	165	09:00 – 22:00	1
	3 Bed – Living Room			09:00 – 22:00	0.75
	3 Bed - Kitchen			09:00 – 22:00	0.25

APPENDIX 4: OCCUPANCY AND EQUIPMENT GAINS

Description	Peak Load (W)	Hours of Occupancy	Percentage of load
Single Bedroom	80	23:00 – 08:00	0.13
		08:00 - 23:00	1
Double Bedroom	80	23:00 – 08:00	0.13
		08:00 – 23:00	1
Living Room/Kitchen	450	00:00 – 09:00	0.19
		09:00 – 18:00	0.24
		18:00 – 20:00	1
		20:00 – 22:00	0.44
		22:00 – 24:00	0.24
Living Room	150	00:00 - 09:00	0.23
		09:00 – 18:00	0.4
		18:00 – 22:00	1
		22:00 – 24:00	0.4
Kitchen	300	00:00 – 18:00	0.17
		18:00 – 20:00	1
		20:00 – 24:00	0.17

APPENDIX 5: DSY2 AND DSY3 RESULTS

Table 10 - Summary of all assessed living spaces and bedrooms against CIBSE TM59 criteria a and b, using DSY2 and DSY3 weather files

Reference	DSY 2		Pass/ Fail	DSY 3		Pass/ Fail
	Criteria a (≤ 3%)	Criteria b (≤ 1%)		Criteria a (≤ 3%)	Criteria b (≤ 1%)	
A-3-3_Bedroom 1	1	1.22	FAIL	0.9	1.46	FAIL
A-3-3_Bedroom 2	1.1	1.19	FAIL	0.9	1.43	FAIL
A-3-3_Kitchen	3.9	-	FAIL	5.7	-	FAIL
A-3-3_Living Room	3.1	-	FAIL	4.4	-	FAIL
C-5-3_Bedroom 1	1	1.19	FAIL	0.9	1.80	FAIL
C-5-3_Bedroom 2	1.1	1.19	FAIL	1.1	1.77	FAIL
C-5-3_Kitchen	1.5	-	PASS	1.3	-	PASS
C-5-3_Living Room	1.9	-	PASS	1.6	-	PASS
C-5-4_Bedroom 1	1	0.79	PASS	1.1	1.00	PASS
C-5-4_Bedroom 2	0.5	0.76	PASS	0.8	1.07	FAIL
C-5-4_Bedroom 3	0.8	0.76	PASS	1	1.22	FAIL
C-5-4_Kitchen	4	-	FAIL	5.7	-	FAIL
C-5-4_Living Room	4.1	-	FAIL	6.2	-	FAIL
E-5-2_Bedroom 1	1.7	0.79		2.2	1.22	FAIL
E-5-2_Kitchen	3.3	-	FAIL	3.7	-	FAIL
E-5-2_Living Room	4.3	-	FAIL	5.6	-	FAIL
E-5-3_Bedroom 1	1.4	1.22	FAIL	1.6	1.80	FAIL
E-5-3_Kitchen	1.5	-	PASS	1.2	-	PASS
E-5-3_Living Room	1.9	-	PASS	1.5	-	PASS
M-5-1_Bedroom 1	1.9	0.70	PASS	3.1	1.19	FAIL
M-5-1_Kitchen	2.3	-	PASS	2.7	-	PASS
M-5-1_Living Room	2.4	-	PASS	3.3	-	PASS
M-5-3_Bedroom 1	1.1	1.07	FAIL	1.1	1.64	FAIL
M-5-3_Kitchen	0.8	-	PASS	0.7	-	PASS
M-5-3_Living Room	1.2	-	PASS	1.1	-	PASS
M-5-4_Bedroom 1	0.2	1.00	PASS	0.3	1.22	FAIL
M-5-4_Bedroom 2	0.3	0.88	PASS	0.5	1.07	FAIL
M-5-4_Bedroom 3	0.5	0.91	PASS	0.7	1.16	FAIL
M-5-4_Kitchen	0.1	-	PASS	0.3	-	PASS
M-5-4_Living Room	0.1	-	PASS	0.5	-	PASS
N-3-5_Bedroom 1	0.8	0.94	PASS	1	1.25	FAIL
N-3-5_Kitchen	1.3	-	PASS	1.5	-	PASS
N-3-5_Living Room	1.8	-	PASS	2.2	-	PASS
O-3-3_Bedroom 1	0.1	0.70	PASS	0.4	1.10	FAIL
O-3-3_Bedroom 2	0.1	0.67	PASS	0.5	1.07	FAIL

O-3-3_Kitchen	0.1	-	PASS	0.3	-	PASS
O-3-3_Living Room	0.1	-	PASS	0.4	-	PASS
R-4-2_Bedroom 1	0.1	0.97	PASS	0	1.40	FAIL
R-4-2_Bedroom 2	0.3	0.97	PASS	0.4	1.40	FAIL
R-4-2_Kitchen	0.7	-	PASS	0.7	-	PASS
R-4-2_Living Room	0.6	-	PASS	0.9	-	PASS
R-4-3_Bedroom 1	0.2	1.07	FAIL	0	1.31	FAIL
R-4-3_Bedroom 2	0.7	1.13	FAIL	0.5	1.40	FAIL
R-4-3_Kitchen	1.2	-	PASS	1	-	PASS
R-4-3_Living Room	1.6	-	PASS	1.3	-	PASS
T-3-4_Bedroom 1	0	0.73	PASS	0	1.00	PASS
T-3-4_Kitchen	0	-	PASS	0	-	PASS
T-3-4_Living Room	0.1	-	PASS	0	-	PASS
U-3-4_Bedroom 1	0.2	0.88	PASS	0.6	1.34	FAIL
U-3-4_Bedroom 2	0.3	0.85	PASS	0.8	1.31	FAIL
U-3-4_Kitchen	0.8	-	PASS	1.5	-	PASS
U-3-4_Living Room	1	-	PASS	1.5	-	PASS
V-5-4_Bedroom 1	0.9	0.82	PASS	1	1.16	FAIL
V-5-4_Kitchen	1.8	-	PASS	1.5	-	PASS
V-5-4_Living Room	1.9	-	PASS	1.7	-	PASS
V-5-5_Bedroom 1	0.1	0.73	PASS	0.4	1.28	FAIL
V-5-5_Bedroom 2	0.8	0.61	PASS	1	1.10	FAIL
V-5-5_Bedroom 3	0.1	0.76	PASS	0.5	1.31	FAIL
V-5-5_Kitchen	2.4	-	PASS	3.2	-	FAIL
V-5-5_Living Room	3.9	-	FAIL	6.1	-	FAIL
W-3-1_Bedroom 1	1.1	0.64	PASS	1.2	1.00	PASS
W-3-1_Kitchen	1.4	-	PASS	1.5	-	PASS
W-3-1_Living Room	1.7	-	PASS	1.7	-	PASS
W-3-2_Bedroom 1	0	0.85	PASS	0	1.46	FAIL
W-3-2_Kitchen	0	-	PASS	0	-	PASS
W-3-2_Living Room	0	-	PASS	0	-	PASS
G-1-0_Kitchen	1.5	-	PASS	2	-	PASS
G-1-0_Living Room	1.9	-	PASS	3.2	-	FAIL
G-1-1_Bedroom 1	1.2	1.10	FAIL	1.6	1.31	FAIL
G-1-1_Bedroom 2	1.4	1.00	PASS	1.6	1.28	FAIL
G-1-1_Living Room	2.1	-	PASS	3.3	-	FAIL
G-1-2_Bedroom 3	0	0.79	PASS	0	1.16	FAIL
G-1-2_Bedroom 4	0.1	0.97	PASS	0	1.04	FAIL
G-2-0_Kitchen	1.4	-	PASS	1.8	-	PASS
G-2-0_Living Room	1.9	-	PASS	3.1	-	FAIL
G-2-1_Bedroom 1	1.1	1.04	FAIL	1.3	1.28	FAIL
G-2-1_Bedroom 2	1	0.82	PASS	1.3	1.19	FAIL
G-2-1_Living Room	1.8	-	PASS	2.2	-	PASS
G-2-2_Bedroom 3	0	0.64	PASS	0	1.04	FAIL
G-2-2_Bedroom 4	0	0.82	PASS	0	1.04	FAIL
J-1-0_Kitchen	2	-	PASS	2.6	-	PASS
J-1-0_Living Room	2.4	-	PASS	3.4	-	PASS

J-1-1_Bedroom 1	1.4	1.04	FAIL	2.3	1.61	FAIL
J-1-1_Bedroom 2	1.6	0.88	PASS	2.3	1.43	FAIL
J-1-1_Living Room	2.1	-	PASS	2.8	-	PASS
J-1-2_Bedroom 3	0	0.85	PASS	0.2	1.19	FAIL
J-1-2_Bedroom 4	0.7	1.25	FAIL	1	1.83	FAIL
J-1-3_Bedroom 5	0.2	0.82	PASS	0.5	1.22	FAIL
J-1-3_Living Room	0.6	-	PASS	1.1	-	PASS
P-1-0_Kitchen	2.1	-	PASS	2.7	-	PASS
P-1-0_Living Room	2.6	-	PASS	4	-	FAIL
P-1-1_Bedroom 1	1	1.10	FAIL	1.2	1.34	FAIL
P-1-1_Bedroom 2	0.5	0.94	PASS	0.7	1.67	FAIL
P-1-1_Bedroom 3	0.5	0.85	PASS	0.7	1.28	FAIL
P-1-2_Bedroom 4	0	0.64	PASS	0.2	0.97	PASS
P-2-0_Kitchen	2	-	PASS	2.7	-	PASS
P-2-0_Living Room	2.4	-	PASS	3.9	-	FAIL
P-2-1_Bedroom 1	1	1.00	PASS	1	1.22	FAIL
P-2-1_Bedroom 2	0.4	0.85	PASS	0.7	1.49	FAIL
P-2-1_Bedroom 3	0.3	0.73	PASS	0.6	1.22	FAIL
P-2-2_Bedroom 4	0	0.61	PASS	0	0.91	PASS

Table 11 - Summary of all assessed corridors against CIBSE TM59 criteria, using DSY2 and DSY3 weather files

Reference	DSY2 CIBSE TM 59 Hrs > 28°C	Pass/ Fail	DSY3 CIBSE TM 59 Hrs > 28°C	Pass/ Fail
C-C-0_Corridor 1	0.4	PASS	0.6	PASS
C-C-0_Corridor 2	0.3	PASS	0.7	PASS
C-C-1_Corridor 1	0.7	PASS	1.1	PASS
C-C-1_Corridor 2	0.3	PASS	0.6	PASS
C-C-2_Corridor 1	1.2	PASS	2	PASS
C-C-2_Corridor 2	0.4	PASS	0.7	PASS
C-C-3_Corridor 1	2.4	PASS	3.6	FAIL
C-C-3_Corridor 2	0.4	PASS	0.7	PASS
C-C-4_Corridor 1	3.3	FAIL	5.2	FAIL
C-C-4_Corridor 2	0.4	PASS	0.8	PASS
C-C-5_Corridor 1	2	PASS	3.4	FAIL
C-C-5_Corridor 2	0.4	PASS	0.8	PASS
M-C-0_Corridor 1	0.5	PASS	1.4	PASS
M-C-0_Corridor 2	0.2	PASS	0.6	PASS
M-C-0_Corridor 3	0.5	PASS	1.2	PASS
M-C-1_Corridor 1	0.5	PASS	1.1	PASS
M-C-1_Corridor 2	0	PASS	0.3	PASS
M-C-2_Corridor 1	0.7	PASS	1.4	PASS
M-C-2_Corridor 2	0.1	PASS	0.4	PASS
M-C-3_Corridor 1	1.2	PASS	2.3	PASS
M-C-3_Corridor 2	0.5	PASS	1.1	PASS

M-C-4_Corridor 1	1.4	PASS	2.7	PASS
M-C-4_Corridor 2	1.4	PASS	2.8	PASS
M-C-5_Corridor 1	1.2	PASS	2.4	PASS
M-C-5_Corridor 2	1.3	PASS	2.5	PASS

Table 12 - Summary of CIBSE TM52 Results for Occupied Spaces, Comfort Cooling Design, using DSY2 and DSY3 weather file

Reference	Criterion 1 Hours >ΔT	Criterion 2 $W_e \leq 6$	Criterion 3 $\Delta T \leq 4$ K	CIBSE TM52 Compliance
Community Centre_00_Community Lounge	0	0	0	PASS
Community Centre_00_Loft/Kitchen	0	0	0	PASS
Community Centre_00_Reception	0	0	0	PASS
Community Centre_01_Activity Hall	0	0	0	PASS
Community Centre_01_ICT Room	0	0	0	PASS
Community Centre_01_Meeting Room	0	0	0	PASS
Community Centre_01_Sensory Room	0	0	0	PASS
Community Centre_02_Art Room	0	0	0	PASS
Community Centre_02_Meeting Room	0	0	0	PASS
Community Centre_02_Music Studio 1	0	0	0	PASS
Community Centre_02_Musci Studio 2	0	0	0	PASS
Makers Lab_00_Kitchenette	0	0	0	PASS
Makers Lab_00_Workshop	0	0	0	PASS
Makers Lab_01_Workshop	0	0	0	PASS

These results show the performance of the regeneration of Ham Close using DSY2 and DSY3 weather files, which represent rare weather events that are not representative of a typical or common summer and are unlikely to occur regularly. Following the results of the Overheating Assessment, some guidance has been provided to help occupants prevent overheating, which shall be provided to residents when they occupy the dwellings:

- Ensure internal gains are minimised, by turning off lighting and appliances that may generate heat.
- Leaving windows partially open can lead to effective ventilation and prevent the build-up of heat. When this is not possible, the MVHR can be used to provide ventilation.
- When heat builds up, open the windows to purge the room of heat. When possible, open internal doors and windows to allow cross ventilation throughout the unit.
- Internal blinds can be an effective mitigation measure by reducing the amount of solar gain within occupied spaces during the day.

APPENDIX 5: GOOD HOMES ALLIANCE EARLY STAGE OVERHEATING RISK TOOL

EARLY STAGE OVERHEATING RISK TOOL

Version 1.0, July 2019

This tool provides guidance on how to assess overheating risk in residential schemes at the early stages of design. It is specifically a pre-detail design assessment intended to help identify factors that could contribute to or mitigate the likelihood of overheating.
The questions can be answered for an overall scheme or for individual units. Score zero wherever the question does not apply.
Additional information is provided in the accompanying guidance, with examples of scoring and advice on next steps.
Find out more information and download accompanying guidance at goodhomes.org.uk/overheating-in-new-homes

Good Homes Alliance

KEY FACTORS INCREASING THE LIKELIHOOD OF OVERHEATING	KEY FACTORS REDUCING THE LIKELIHOOD OF OVERHEATING

Geographical and local context

#1 Where is the scheme in the UK? See guidance for map	South east	4	4
	Northern England, Scotland & NI	0	
	Rest of England and Wales	2	
#2 Is the site likely to see an Urban Heat Island effect? See guidance for details	Central London (see guidance)	3	3
	Grtr London, Manchester, B'ham	2	
	Other cities, towns & dense sub-urban areas	1	

#8 Do the site surroundings feature significant blue/green infrastructure? Proximity to green spaces and large water bodies has beneficial effects on local temperatures; as guidance, this would require at least 50% of surroundings within a 100m radius to be blue/green, or a rural context	1	1

Site characteristics

#3 Does the site have barriers to windows opening? - Noise/Acoustic risks - Poor air quality/smells e.g. near factory or car park or very busy road - Security risks/crime - Adjacent to heat rejection plant	Day - reasons to keep all windows closed	8	4
	Day - barriers some of the time, or for some windows e.g. on quiet side	4	
	Night - reasons to keep all windows closed	8	4
	Night - bedroom windows OK to open, but other windows are likely to stay closed	4	

#9 Are immediate surrounding surfaces in majority pale in colour, or blue/green? Lighter surfaces reflect more heat and absorb less so their temperatures remain lower; consider horizontal and vertical surfaces within 10m of the scheme	1	0
#10 Does the site have existing tall trees or buildings that will shade solar-exposed glazed areas? Shading onto east, south and west facing areas can reduce solar gains, but may also reduce daylight levels	1	0

Scheme characteristics and dwelling design

#4 Are the dwellings flats? Flats often combine a number of factors contributing to overheating risk e.g. dwelling size, heat gains from surrounding areas; other dense and enclosed dwellings may be similarly affected - see guidance for examples	3	3
#5 Does the scheme have community heating? i.e. with hot pipework operating during summer, especially in internal areas, leading to heat gains and higher temperatures	3	3

#11 Do dwellings have high exposed thermal mass AND a means for secure and quiet night ventilation? Thermal mass can help slow down temperature rises, but it can also cause properties to be slower to cool, so needs to be used with care - see guidance		1	0
#12 Do floor-to-ceiling heights allow ceiling fans, now or in the future? Higher ceilings increase stratification and air movement, and offer the potential for ceiling fans	>2.8m and fan installed	2	1
	> 2.8m	1	

Solar heat gains and ventilation

#6 What is the estimated average glazing ratio for the dwellings? (as a proportion of the facade on solar-exposed areas i.e. orientations facing east, south, west, and anything in between). Higher proportions of glazing allow higher heat gains into the space	>65%	12	4
	>50%	7	
	>35%	4	
#7 Are the dwellings single aspect? Single aspect dwellings have all openings on the same facade. This reduces the potential for ventilation	Single-aspect	3	0
	Dual aspect	0	

#13 Is there useful external shading? Shading should apply to solar exposed (E/S/W) glazing. It may include shading devices, balconies above, facade articulation etc. See guidance on "full" and "part". Scoring depends on glazing proportions as per #6		Full	Part	1
	>65%	6	3	
	>50%	4	2	
	>35%	2	1	

#14 Do windows & openings support effective ventilation? Larger, effective and secure openings will help dissipate heat - see guidance	Openings compared to Part F purge rates			0
	= Part F	+50%	+100%	
	Single-aspect minimum required	3	4	
	Dual aspect minimum required	2	3	

TOTAL SCORE	22	=	Sum of contributing factors:	25	*minus*	Sum of mitigating factors:	3

High 12 Medium 8 Low

score >12:
Incorporate design changes to reduce risk factors and increase mitigation factors
AND Carry out a detailed assessment (e.g. dynamic modelling against CIBSE TM59)

score between 8 and 12:
Seek design changes to reduce risk factors and/or increase mitigation factors
AND Carry out a detailed assessment (e.g. dynamic modelling against CIBSE TM59)

score <8:
Ensure the mitigating measures are retained, and that risk factors do not increase (e.g. in planning conditions)