



HODKINSON



**Dynamic Overheating
Report**

Drapers' Almshouse Charity

Edmanson's Close

Final

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Executive Summary

This report details the methodology and findings of the overheating assessment of a sample of representative dwellings for the proposed development at Edmansons Close by Drapers' Almhouse charity in the London Borough of Haringey.

A dynamic overheating assessment has been undertaken for representative new build and refurbished units on site, and a review of mitigation measures was undertaken.

Dwellings have been selected for the overheating assessment based on design characteristics that establish them as representative of the overall proposed scheme. This selection of dwellings includes consideration of varying floors and of different orientations.

For the purposes of this report, it is assumed that dwellings will utilise openable windows as the primary means of ventilation. Passive measures such as high efficiency building fabric, solar control glazing, enhanced mechanical ventilation rates have been explored as far as practicable to avoid the need for active cooling. External shading in the form of balconies have been used across many facades. External louvres are also added to the south façade of the apartment building to reduce heat. Additionally, building design and window locations have been optimised to mitigate overheating.

The performance of the newly developed dwellings has been assessed against the guidelines from the new Approved Document O (AD(O)) (2021) and the Chartered Institution of Building Services Engineers (CIBSE) guidance TM59 Design methodology for the assessment of overheating risk in homes (2017). This dynamic overheating assessment of representative dwellings demonstrates that an acceptable overheating risk is achieved. The dwellings tested demonstrate compliance with the AD(O) and CIBSE TM59 overheating assessment criteria under the mandatory weather file (DSY1 for the 2020s, high emissions, 50% percentile scenario).

The refurbished units will not be subject to AD(O) for Overheating (2021) of the Building Regulations since AD(O) only applies to new residential dwellings. For the refurbished dwellings, mitigation measures were assessed based on feasibility and possible impacts and it was concluded that, for this development, improving the glazing specifications, adding internal blinds and standing fans are the most feasible measures to decrease the risk of overheating on site. A CIBSE TM59 analysis is undertaken to determine the improvements in relation to the old design. Compliance with criterion A increased from 7 percent to 100 percent with all zones passing the adaptive criteria. For criterion B, although bedrooms still fail, the number of nights exceeding the criteria has decreased from 31 nights annually to 7 nights.

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1. INTRODUCTION

- 1.1** This document has been prepared by Hodkinson Consultancy, a specialist energy and environmental consultancy for planning and development to present the overheating mitigation strategy for the proposed development at Edmansons Close by Drapers' Almhouse charity in the London Borough of Haringey.

Site Location

- 1.2** The proposed development site at Edmansons Close is located on Bruce Grove, Tottenham in the London Borough of Haringey, as shown in Figure 1 below.
- 1.3** Bruce Grove (A10) runs from the northwest to the southeast of the site. The surrounding area consists predominantly of residential buildings.

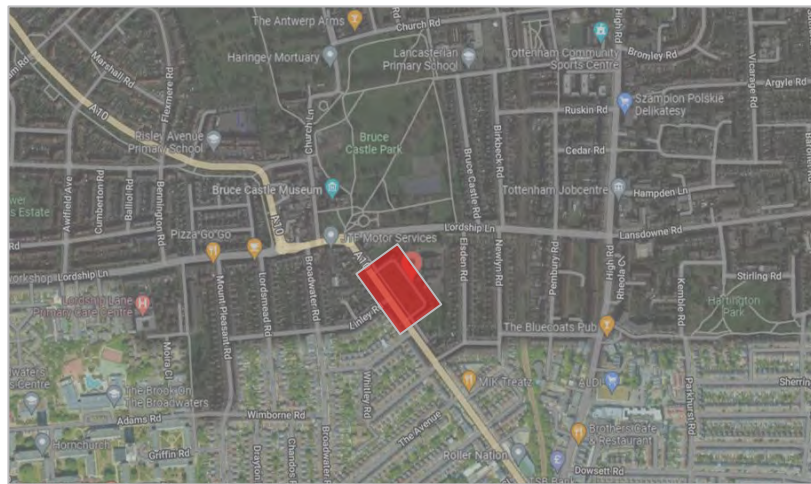


Figure 1: Site Location Google maps © 2022

Proposed Development

- 1.4** This analysis focuses on the new proposed dwellings within the development. The redevelopment is described as follows:

'Demolition of existing laundry building and 1970s infill building; alterations and extensions to 44 existing almshouses to create 8 x 1 bed, 12 x 2 bed and 6 x 3 bed units; alterations to existing Gatehouse to provide 1 x 2 bed unit; construction of 1 x new build 3 bed almshouse to replace 1970s infill building; construction of a new apartment building comprising 7 x studio units and 9 x 1 bed units; construction of 4 x new build 2 bed units within two new pavilions (2 units in each pavilion, 4 units in total); with landscaping; improvements to access; provision of five disabled parking spaces; and ancillary development thereto.'

1.5 Figure 2 below indicates the proposed site plan.

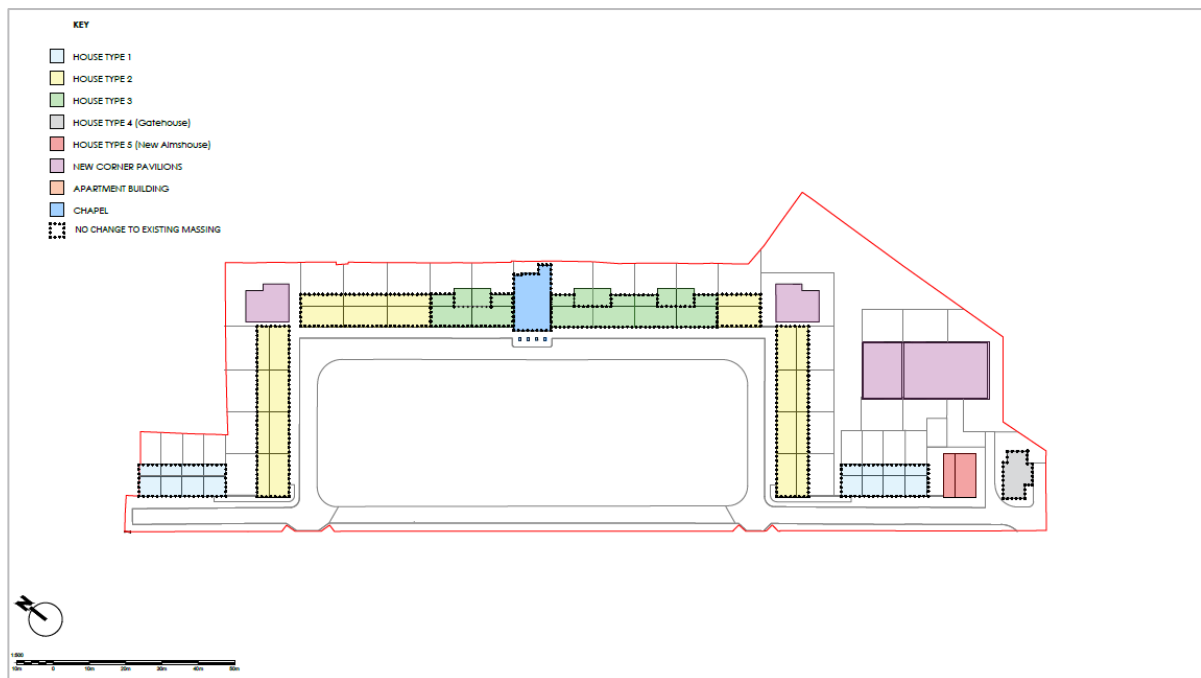


Figure 2: Proposed Site Layout – d+b studios (2022)

Overheating and Thermal Comfort

- 1.6 Maintaining comfortable thermal comfort conditions in the face of climate change and increasing temperatures is one of the greatest challenges to be addressed by designers. The main objective is to achieve thermal comfort and minimise summertime overheating without the use of conventional air conditioning systems, which typically have associated greenhouse gas emissions and impact on the urban heat island effect.
- 1.7 Dynamic thermal simulations have been carried out for representative new and refurbished dwellings, to determine whether there is a risk of overheating. New dwellings fall under Approved Document O while the refurbished will utilise CIBSE TM59 only.
- 1.8 Appropriate mitigation measures have been recommended to mitigate the overheating risk and ensure that comfortable thermal conditions are achieved.

2. PLANNING POLICY

- 2.1 The following planning policies and requirements have informed the sustainable design of the proposed development.

National Planning Policy: NPPF

- 2.2** The revised National Planning Policy Framework (NPPF) was published on the 19th December 2023 and sets out the Government's planning policies for England. It describes a proactive approach that plans should take to mitigating and adapting to climate change, considering the risk of overheating from rising temperatures.
- 2.3** New developments should be planned for in ways that avoid increased vulnerability to the range of impacts arising from climate change.

Regional Planning Policy: The London Plan (2021)

- 2.4** The following key policy in the newly adapted version of the London Plan; although this policy is only relevant for new builds, the cooling hierarchy (Figure 1) is used to guide the adaptive measures for the refurbished dwellings on site.
- 2.5** **Policy SI4 Managing Heat Risk** states that development proposals should minimise adverse impacts on urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure and that 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 (Figure 3):

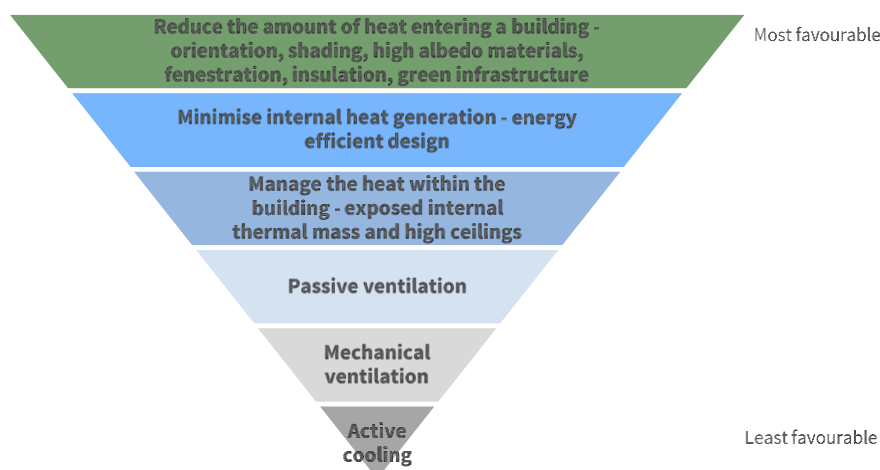


Figure 3: Cooling Hierarchy (London Plan 2021)

- 2.6** Passive ventilation should be prioritised, (accounting for external noise issues and local air quality). The increased use of air conditioning systems is not desirable. If active cooling systems, such as air conditioning systems, are unavoidable, these should be designed to reuse the waste heat they produce.

3. OVERHEATING CRITERIA

- 3.1** The following building regulations and guidance provide a standardised approach to predicting overheating risk in residential dwellings within the UK. They set out the criteria by which the risk of overheating can be assessed or identified.
- 3.2** Approved Document O (AD(O)) only applies to new residential buildings therefore only the apartment building, corner pavilion and House type 5 will be assessed against it. For the refurbished dwellings TM59 will be used to assess overheating.

Approved Document O (2021)

- 3.3** AD(O) Compliance is based on meeting the following requirements:
- > Reasonable provision to limit unwanted solar gains in summer and to provide adequate means to remove excess heat;
 - > Taking account of safety, noise, pollution, protection of falling and entrapment when developing the strategy. Mechanical cooling should only be considered when feasible passive means are insufficient.
- 3.4** There are two methods for demonstrating compliance under AD(O):
- > **Simplified:** The simplified method requires dwellings to accommodate design limitations on maximum glazed areas, minimum openable areas for natural ventilation and external shading.
 - > **Dynamic:** The dynamic method requires dwellings to demonstrate compliance with CIBSE TM59 criteria (with a few specific limitations on use of the TM59 methodology) via dynamic thermal modelling.

CIBSE TM59 (2017) Assessment Criteria

- 3.5** The criteria for the assessment of overheating risk have been specified by the Chartered Institute of Building Services Engineers (CIBSE) in TM59 *Design methodology for the assessment of overheating risk in homes* (2017). CIBSE TM59 provides a standardised approach to predicting overheating risk for both naturally and mechanically ventilated residential buildings.
- 3.6** The following criteria must be met in order to demonstrate compliance under a predominantly naturally ventilated scenario:
- > **Criterion A:** The indoor operative temperature should not exceed the threshold comfort temperature by 1°C or more for more than 3% of occupied hours in living rooms, kitchens and bedrooms.
 - > **Criterion B:** To guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10 pm to 7 am should not exceed 26°C for more than 1% of annual hours.

4. DYNAMIC MODELLING APPROACH

4.1 Dynamic thermal modelling was undertaken using DesignBuilder Software (v.7). The performance of the units has been assessed under the following:

- > The refurbished units are assessed against CIBSE TM59 guidance;
- > The new builds are assessed against CIBSE TM59 guidance and the guidelines from the new Approved Document (O).

4.2 Approved Document O override certain TM59 aspects wherein changes have been made to the assumptions of window openability. The new AD(O) reduces temperature-based changes to the model, rather, focusing on the occupant behaviour to provide a more realistic set of results for overheating.

Unit Selection

4.3 In line with the requirements listed within Haringey's Carbon Management Response (22/05/2023) fourteen representative dwelling units from the new proposed dwellings on site have been assessed. The selection of the units for overheating risk assessment was based on the following design characteristics:

- > Worst-case orientations;
- > Typology (apartment, house);

4.4 The location and the internal layouts of the homes selected for assessment are presented in Appendix A. Design modelling inputs for the assessed dwellings can be found in Appendix B.

Site External Weather Conditions

4.5 External temperatures and incident solar gains are greatest during summer months, coinciding with periods of lower wind speeds. Solar altitude is also highest during summer months, increasing the effects of façade shading from balcony overhangs and window reveals. Such considerations should be accounted for when designing for overheating risk.

4.6 The effects of external conditions are vital in an overheating assessment as they influence:

- > Solar heat gains (a function of incident direct and diffuse solar radiation and solar altitude); and
- > Calculated natural ventilation rates (a function of external temperature, wind directions and speeds).

- 4.7** CIBSE design summer year (DSY) weather data for London Weather Centre weather file for DSY 1 for 2020s, high emissions, 50% percentile scenario. This weather file location represents inner urban areas in central London and has been specifically requested within Haringey's comments.
- 4.8** The assessment of overheating risk has been undertaken using the DSY1 weather file, in accordance with the requirements of TM59 and the London Plan. The final mitigation strategy has also been tested under the more extreme DSY2 and DSY3 weather files and the results are presented in Appendix C.

Model Geometry and Local Shading

- 4.9** Overshadowing from the building blocks has been taken into account during the simulation, based on the model geometry and the site orientation.
- 4.10** Solar control forms an integral part of overheating mitigation strategies. External shading in the form of balconies and external louvres is applied across many of the façades as part of the design proposals. Although applied, the external louvres do not appear as part of the visualisation model on Designbuilder however the balconies can be seen in Figures 4 and 5.



Figure 4: New dwellings simulation model from DesignBuilder for July 15 07:00.

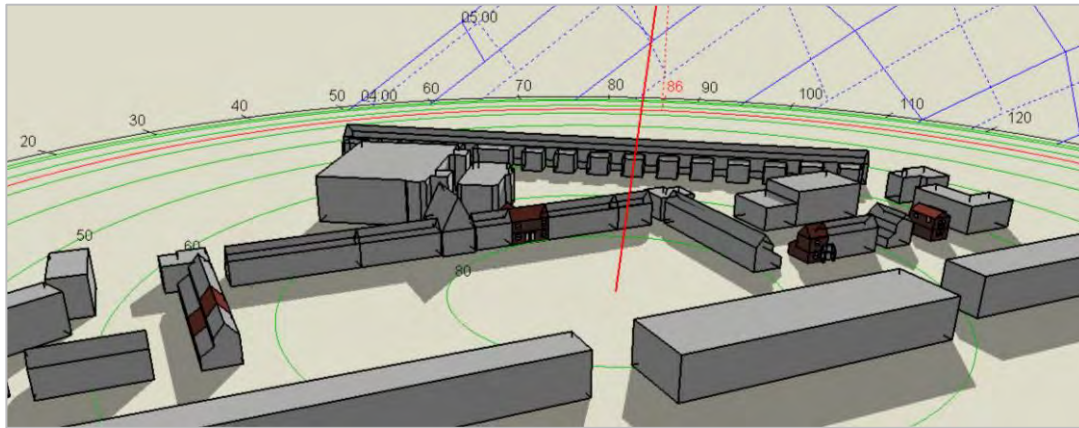


Figure 5: Refurbished houses simulation model from DesignBuilder for July 15 07:00.

- 4.11** Horizontal shading devices such as balconies and overhangs are more efficient when applied in south oriented façades and during midday when the solar angle is high. Their role in reducing solar gains in the summer period is considered to be important.

5. OVERHEATING MITIGATION STRATEGY FOR NEW DWELLINGS

Proposed Measures

- 5.1** The following passive design measures have been incorporated in order to reduce the risk of overheating to an acceptable level, as determined by CIBSE TM59 (refer to Table 1 for a more detailed breakdown:
- > Highly efficient fabric envelope and high efficiency building services heating system, lighting and appliances are proposed in all dwellings to reduce internal gains;
 - > High performance solar control glazing with a g-value of 0.4. This has been balanced to mitigate overheating risk whilst achieving fabric energy efficiency targets and natural daylight provision;
 - > Louvered sliding screens to be added to the south facing facade of the apartment block, subject to approval from the Planning and Conservation officers. Louvres will be painted in the same heritage colour as the windows and doors;
 - > External shading is provided to some windows in form of balconies and increased reveal depths of 250mm; and
 - > Enhanced mechanical ventilation rates of 2ach in bedrooms.

5.2 The following design measures, developed in conjunction with d+b studios, have also been incorporated into the design to mitigate overheating

- > Since the new dwellings are part of an existing development, keeping the character of the design is crucial, therefore adding external elements such as overhangs or external shutters was not ideal.
- > Dwellings have been designed to ensure that exposed East-facing bedrooms have an extra window that would allow for cross ventilation.

Table 1: Design features incorporated in accordance with the London Plan cooling hierarchy for the new buildings

Cooling hierarchy	Design feature	Discussion
1. Reduce amount of heat entering the building	Efficient building fabric and air tightness standards	In line with energy strategy (model inputs provided in Appendix B)
	Solar control glazing with G-value of 0.4 (frame factor of 0.8)	A low G-value reduces solar gain, but has implications on CO ₂ emissions, fabric energy efficiency and internal daylight levels and has therefore been optimised to balance all aspects as far as possible
	External shading provided by balcony overhangs	In line with design proposals
2. Minimise internal heat generation	Energy efficient design of building services	In line with energy strategy (model inputs provided in Appendix B)
3. Manage the heat	Concrete floor slab between dwellings in apartment blocks	The thermal mass of this will help reduce the risk of overheating by absorbing heat during the daytime even if it isn't exposed
4. Passive ventilation	Openable windows used as the primary means of ventilation for overheating since facades with operable windows do not have any noise restrictions (window opening schedule provided in Table 3)	Windows are simulated to gradually open when the internal temperature exceeds 22 °C and the external temperature is lower than the internal temperature, to be fully open when internal temperatures reach 26°C. As per the new AD(O), if at 11:00pm bedroom temperatures exceeds 23°C windows are simulated open through the night, if the temperature is below 23°C windows will be simulated shut.
5. Mechanical ventilation	Background mechanical ventilation rate exceeding minimum Part F	2ach for all bedrooms
6. Active cooling	N/A	No requirement for active cooling

- 5.3** Windows are simulated to gradually open when the internal temperature exceeds 22 °C and the external temperature is lower than the internal temperature, to be fully open when internal temperatures reach 26°C. As per the new AD(O), if at 11:00pm bedroom temperatures exceeds 23°C windows are simulated open through the night, if the temperature is below 23°C windows will be simulated shut.

Results Assuming No Usability Constraints

- 5.4** The following results presented in Table 2 indicate that, based on the design modelling inputs in Appendix B and passive overheating mitigation measures outlined above, all assessed rooms meet the CIBSE TM59 criteria and therefore demonstrate an acceptable level of overheating risk.
- 5.5** These results are based on windows being open with no usability constraints, in accordance with paragraph 2.6 of AD(O)

Table 2: TM59 overheating results for new dwellings under DSY1 2020s assuming no usability constraints

Unit	Room	TM59 Criterion A (pass ≤ 3 %)	TM59 Criterion B (pass ≤ 32)	Compliance
House 5	Kitchen	0.0	N/A	Pass
	Living	0.0	N/A	Pass
	Bedroom1	0.1	30	Pass
	Bedroom2	0.1	31	Pass
Corner Pavilion 0F	Bedroom1	0.0	32	Pass
	Bedroom2	0.1	25	Pass
	LKD	0.2	N/A	Pass
Corner Pavilion 1F	Bedroom1	0.0	24	Pass
	Bedroom2	0.1	24	Pass
	LKD	0.3	N/A	Pass
Apartment Building				
0F - 1-Bed- Northeast	Bedroom	0.0	30	Pass
	LKD	0.0	N/A	Pass
0F - 1-Bed - Northwest	Bedroom	0.0	30	Pass
	LKD	0.0	N/A	Pass
0F - 1-Bed - Southeast	Bedroom	0.0	29	Pass
	LKD	0.0	N/A	Pass
0F - Studio - East	Studio	0.0	20	Pass
0F - Studio - West	Studio	0.1	22	Pass
0F - Studio - Southwest	Studio	0.0	31	Pass
1F - 1-Bed - Northeast	Bedroom	0.0	32	Pass
	LKD	0.0	N/A	Pass

Unit	Room	TM59 Criterion A (pass ≤ 3 %)	TM59 Criterion B (pass ≤ 32)	Compliance
1F - 1-Bed - Northwest	Bedroom	0.0	30	Pass
	LKD	0.0	N/A	Pass
1F - 1-Bed - Southeast	Bedroom	0.0	29	Pass
	LKD	0.0	N/A	Pass
1F - 1-Bed - Southwest	Bedroom	0.1	24	Pass
	LKD	0.1	N/A	Pass
1F - Studio - East	Studio	0.0	20	Pass
1F - Studio - West	Studio	0.1	21	Pass
2F - 1-Bed - Southeast	Bedroom	0.0	31	Pass
	LKD	0.0	N/A	Pass
2F - 1-Bed - Southwest	Bedroom	0.1	24	Pass
	LKD	0.0	N/A	Pass
2F - Studio - East	Studio	0.0	20	Pass
2F - Studio - West	Studio	0.1	21	Pass

Window Opening Constraints

- 5.6** This section will describe any constraints that may prevent windows from being fully opened.
- 5.7** There are no air quality restrictions and the noise constraints do not impact any bedrooms windows.
- 5.8** There are several easily accessible units within the apartment blocks that require windows to remain closed at night as a safety measure; refer to Table 3.

Table 3: Window opening schedules

Floor	Room	Occupancy schedule (TM59)	Window opening schedule
Ground floor – easily accessible	LKD	09:00-22:00	08:00-23:00
	Bedroom	24/7	
All other floors	LKD	09:00-22:00	24/7
	Bedroom	24/7	

- 5.9** The following results presented in Table 4 indicate the impact of nighttime window constraints on the easily accessible units.

Table 4: TM59 overheating results for new dwellings under DSY1 2020s with windows closed at night

Unit	Room	TM59 Criterion A (pass ≤ 3 %)	TM59 Criterion B (pass ≤ 32)	Compliance
Corner Pavilion 0F	Bedroom1	0.0	107	Fail
	Bedroom2	0.2	167	Fail
	LKD	0.3	N/A	Pass
Apartment Building				
0F - 1-Bed- Northeast	Bedroom	0.0	102	Fail
	LKD	0.0	N/A	Pass
0F - 1-Bed - Northwest	Bedroom	0.0	87	Fail
	LKD	0.0	N/A	Pass
0F - 1-Bed - Southeast	Bedroom	0.2	119	Fail
	LKD	0.0	N/A	Pass
0F - Studio - East	Studio	0.1	71	Fail
0F - Studio - West	Studio	0.1	80	Fail
0F - Studio - Southwest	Studio	0.0	81	Fail

- 5.10** Reviewing the results in Table 4 it is evident that although the all the results for criterion A are passing, during sleeping hours when windows are closed the bedrooms fail criterion B.

Mechanical Mitigation Measures

- 5.11** In order to mitigate the residual risk of overheating as a result of security risk in easily accessible units, it is proposed to install an ‘air tempering’ (also known as ‘peak lopping’) cooling coil bolt-on to the MVHR system within the affected dwellings. The air tempering system modelled is assumed to supply 0.97kW and 70l/s per dwelling.
- 5.12** There is no requirement for active cooling within dwellings.
- 5.13** The following results in Table 5 demonstrate that this system will be capable of reducing the risk of overheating to an acceptable level, within the CIBSE TM59 and AD(O) criteria.

Table 5: TM59 overheating results for new dwellings under DSY1 2020s with tempered cooling

Unit	Room	TM59 Criterion A (pass ≤ 3 %)	TM59 Criterion B (pass ≤ 32)	Compliance
Corner Pavilion 0F	Bedroom1	0.0	11	Pass
	Bedroom2	0.0	28	Pass
	LKD	0.0	N/A	Pass
Apartment Building				
0F - 1-Bed - Northeast	Bedroom	0.0	2	Pass
	LKD	0.0	N/A	Pass
0F - 1-Bed - Northwest	Bedroom	0.0	1	Pass
	LKD	0.0	N/A	Pass
0F - 1-Bed - Southeast	Bedroom	0.0	3	Pass
	LKD	0.0	N/A	Pass
0F - Studio - East	Studio	0.0	3	Pass
0F - Studio - West	Studio	0.0	3	Pass
0F - Studio - Southwest	Studio	0.0	0	Pass

- 5.14** The criteria for predominantly naturally ventilated dwellings have been used, as windows can still be relied upon for daytime ventilation.
- 5.15** Therefore, the overheating risk is deemed to be acceptable, as there is only marginal exceedance of
- 5.16** The overheating risk has also been investigated using the more extreme weather files DSY2 and DSY3 and the results are presented in Appendix C, Tables C.1 and C.2.

6. OVERHEATING MITIGATION STRATEGY FOR REFURBISHED DWELLINGS

- 6.1** The existing Almshouses in Edmansons Close are listed as historical buildings so major adjustments cannot be made to the building façade.
- 6.2** Additional mitigation measures in line with the London plan have been described below in Table 6 highlighting their feasibilities in order to minimise the need for active cooling.

Table 6: Review of Design features in accordance with the London Plan cooling hierarchy for the refurbished units

Cooling hierarchy	Design feature	Benefits	Drawbacks	Option
1. Reduce amount of heat entering the building	Internal blinds	Minimizes solar gains on all facades	Requires occupant control	✓
	Overhangs	Minimizes solar gains on the southern façade, fixed so doesn't rely on occupant control	Major impact on façade design and is not acceptable due to heritage perspective	X
	External shutters/blinds	Minimizes solar gains on all facades		X
2. Minimise internal heat generation	Energy efficient Lighting	LED lighting	N/A	✓
3. Manage the heat	Improving Fabric specifications	Window with lower g values have been utilised to reduce the solar heat gain.	N/A	✓
4. Passive ventilation	Operable windows	Can be used on site as the primary means of ventilation for all dwellings	Some bedrooms in existing House type 1 may need to keep windows closed through the night due to noise issues. Overheating can be mitigated in these instances by keeping bedroom doors closed at night	✓
	Lots of Dual aspect units	Allow for cross ventilation throughout the day	N/A	✓
5. Mechanical ventilation	Standing fans	Very occupant friendly as it allows for easy control and no major design changes are required.	N/A	✓
	MEV/ MVHR	More efficient air ventilation system and higher occupant comfort	Requires larger duct sizing and implies additional operational costs to occupants	X

6.3 New mitigation measures that are deemed feasible for these refurbished dwellings include adding internal blinds, upgrading the lighting to LED, increased air speed through standing fans and improving the fabric specifications.

6.4 Table 7 below provides a comparison of the CIBSE TM59 results for the refurbished dwellings before and after refurbishment.

Table 7: CIBSE TM59 Results for the refurbished units prior and post refurbishment

Block	Zone	Prior to refurbishment			Post refurbishment		
		Criterion A (%)	Criterion B (hr)	Pass/Fail	Criterion A (%)	Criterion B (hr)	Pass/Fail
House Type 1	LKD	4.8	N/A	Fail	0.8	N/A	Pass
	Bedroom	9.1	201	Fail	0.8	91	Fail
House Type 2	Living	2.0	N/A	Pass	0.6	N/A	Pass
	LKD	4.5	N/A	Fail	0.6	N/A	Pass
	Bedroom 1	6.8	148	Fail	0.8	65	Fail
	Bedroom 2	8.9	182	Fail	0.8	77	Fail
House Type 3	LKD	3.1	N/A	Fail	0.8	N/A	Pass
	Study	5.4	N/A	Fail	0.6	N/A	Pass
	Bedroom 1	18.4	167	Fail	0.8	91	Fail
	Bedroom 2	13.3	280	Fail	1.2	91	Fail
	Bedroom 3	10.9	185	Fail	1.1	71	Fail
House Type 4	LKD	4.4	N/A	Fail	0.9	N/A	Pass
	Bedroom 1	12.1	114	Fail	1.7	91	Fail
	Bedroom 2	5.6	94	Fail	0.8	91	Fail

6.5 Below is a summary comparing the CIBSE TM59 results before and after the refurbishment

- > Compliance with criterion A increased from 7 percent to 100 percent with all zones passing the adaptive criteria.
- > For criterion B, although bedrooms still fail, the maximum number of nights exceeding the criteria has decreased from 31 nights annually to 7 nights.
- > Overall compliance increased by 36%

6.6 The overheating risk has also been investigated using the more extreme weather files DSY2 and DSY3 and the results are presented in Appendix C, Tables C.3 and C.4.

7. CONCLUSION

- 7.1** This report details the methodology and findings of the overheating assessment of a sample of representative dwellings for the proposed development at Edmansons Close by Drapers' Almhouse charity in the London Borough of Haringey.
- 7.2** A dynamic overheating assessment has been undertaken for representative new build and refurbished units on site, and a review of mitigation measures was undertaken.
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APPENDICES

Appendix A

Assessed Dwellings

Appendix B

Design Modelling Inputs

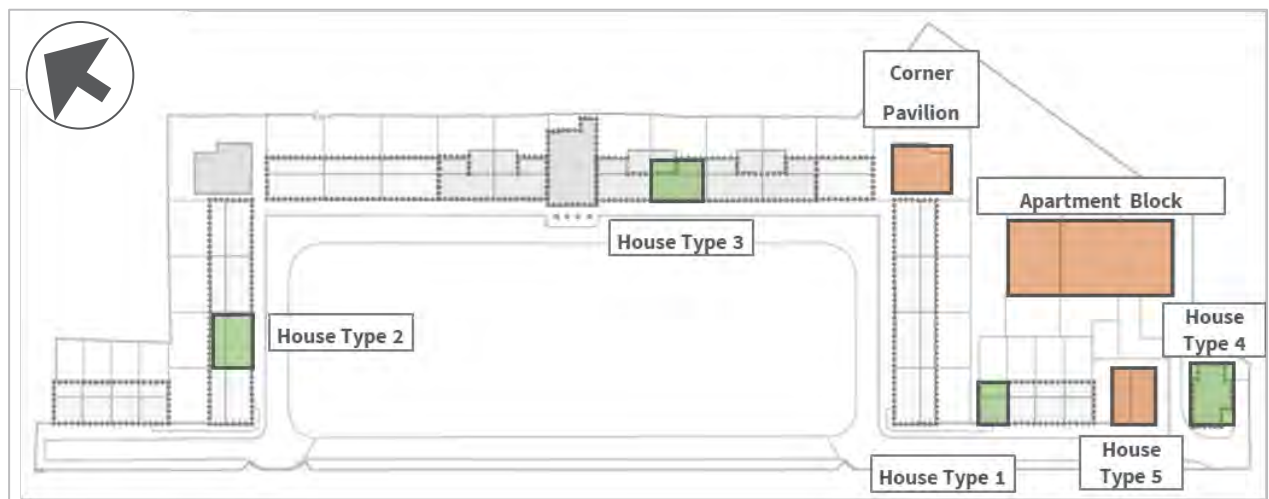
Appendix C

Results of DSY2 and DSY3 Weather Scenarios

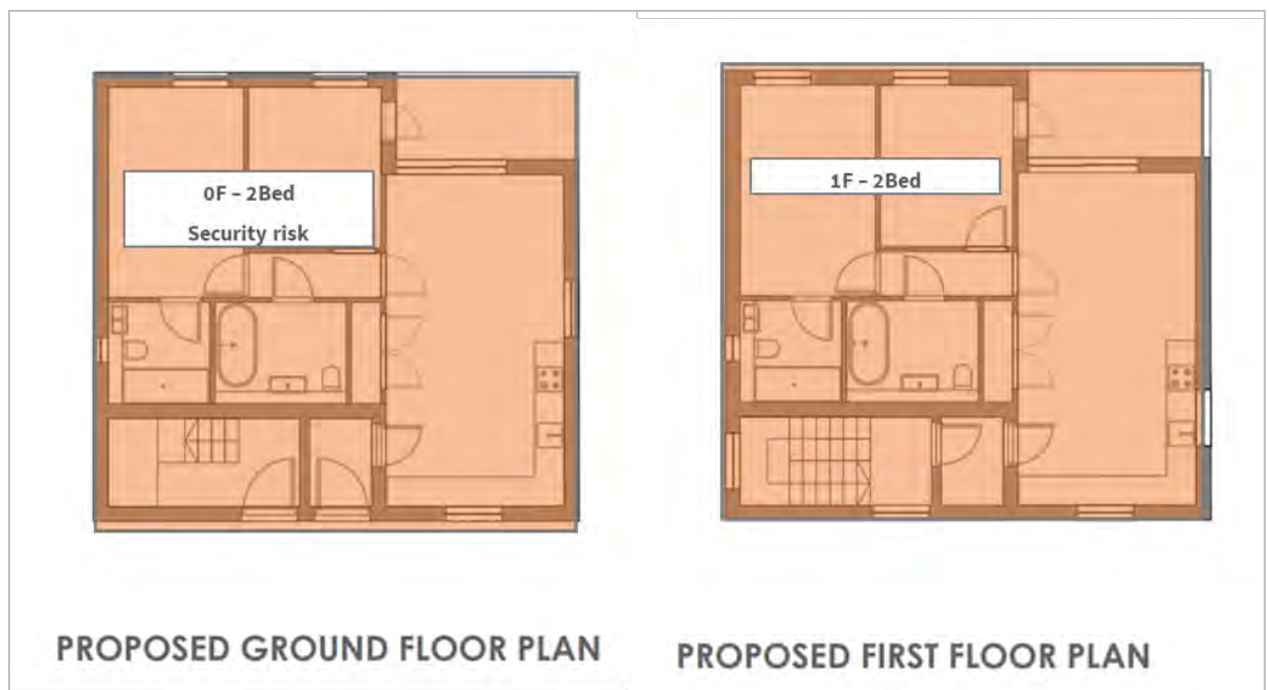
Appendix A

Assessed Dwellings

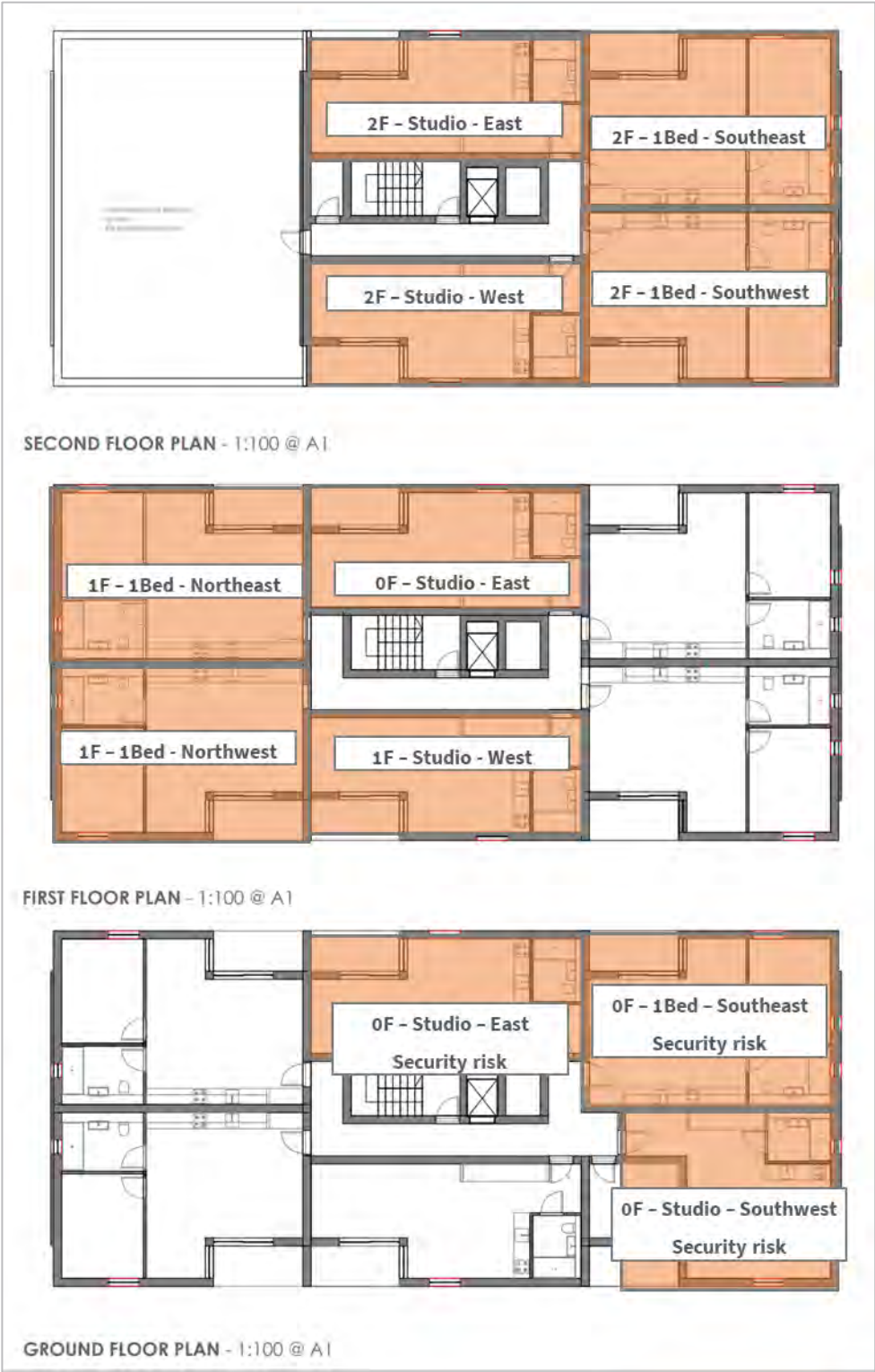
Site plan



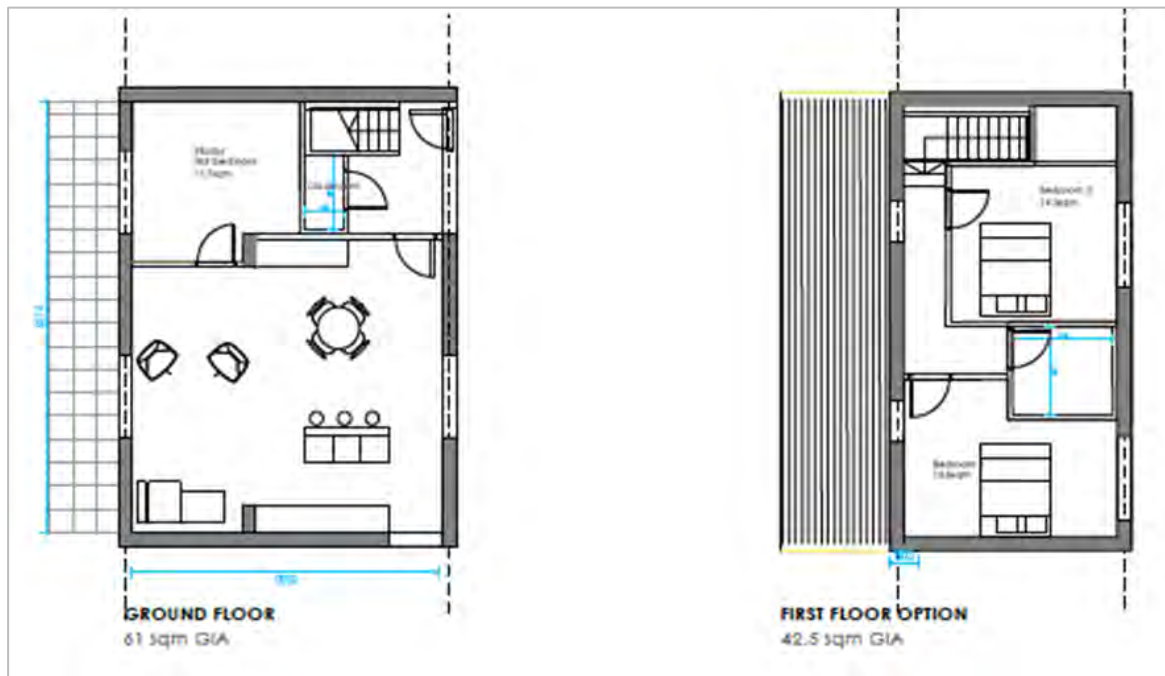
New - Corner Pavilion



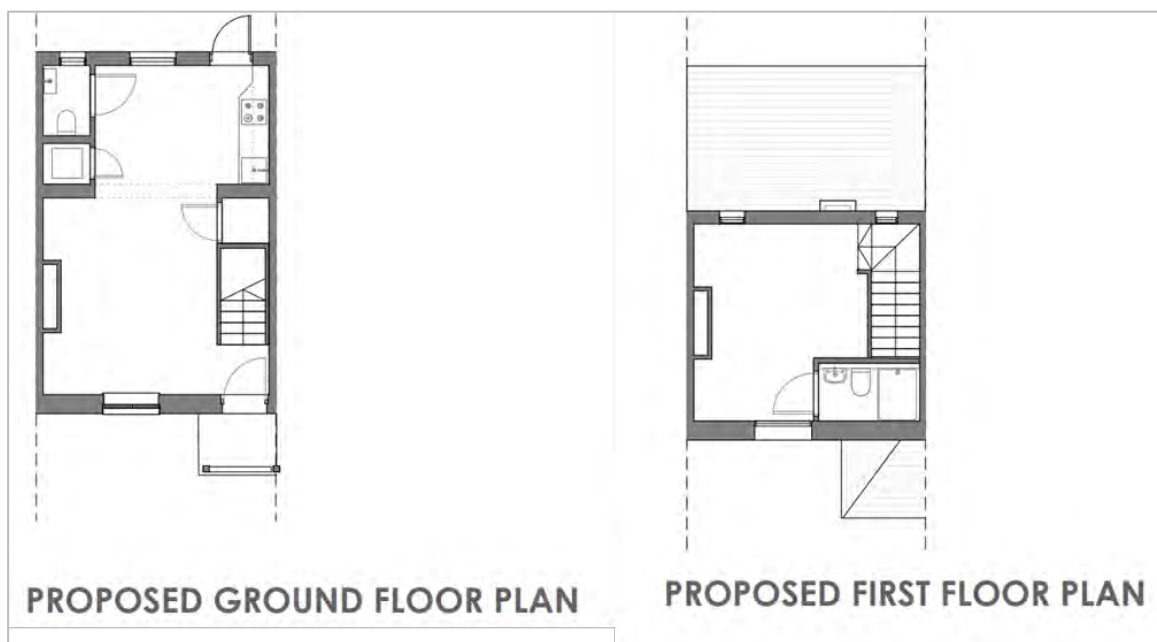
New - Apartment Block



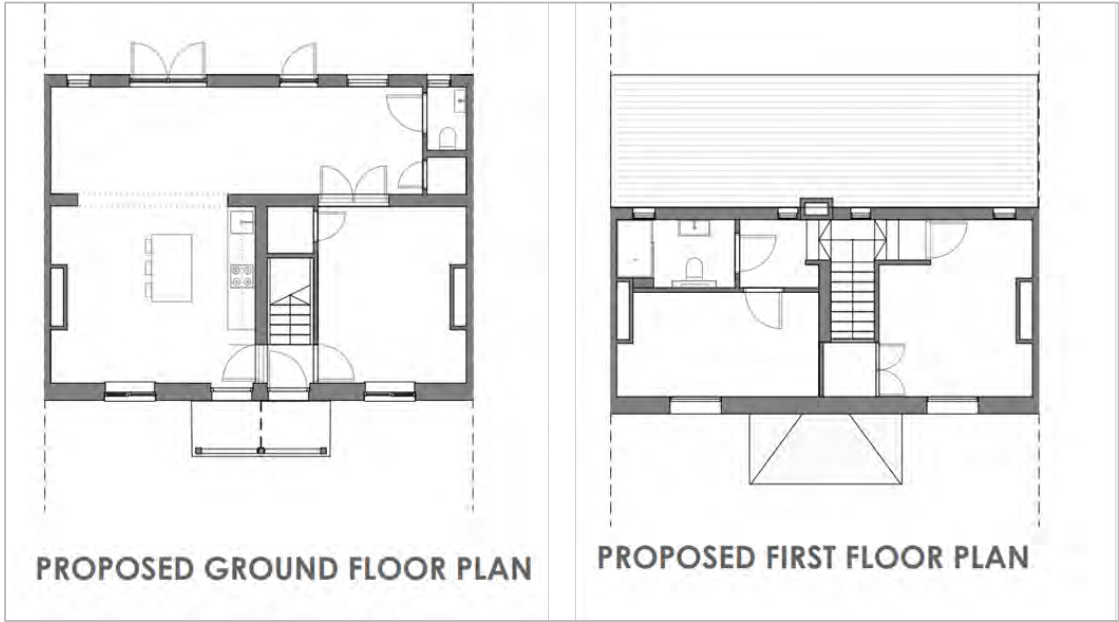
New – House type 5



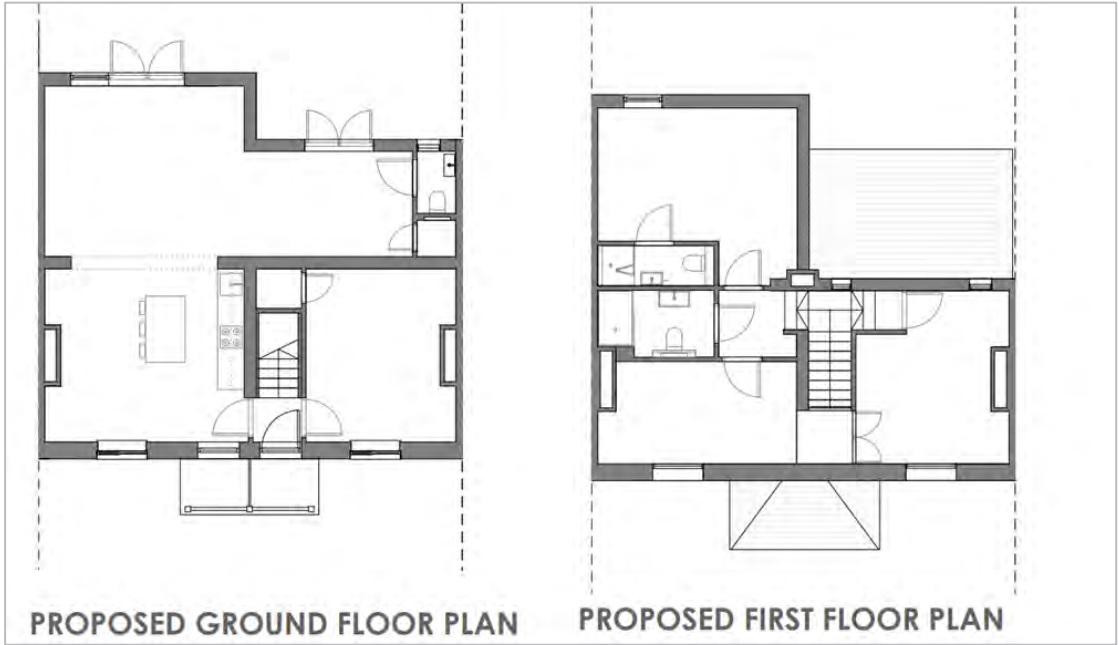
Refurbished – House type 1



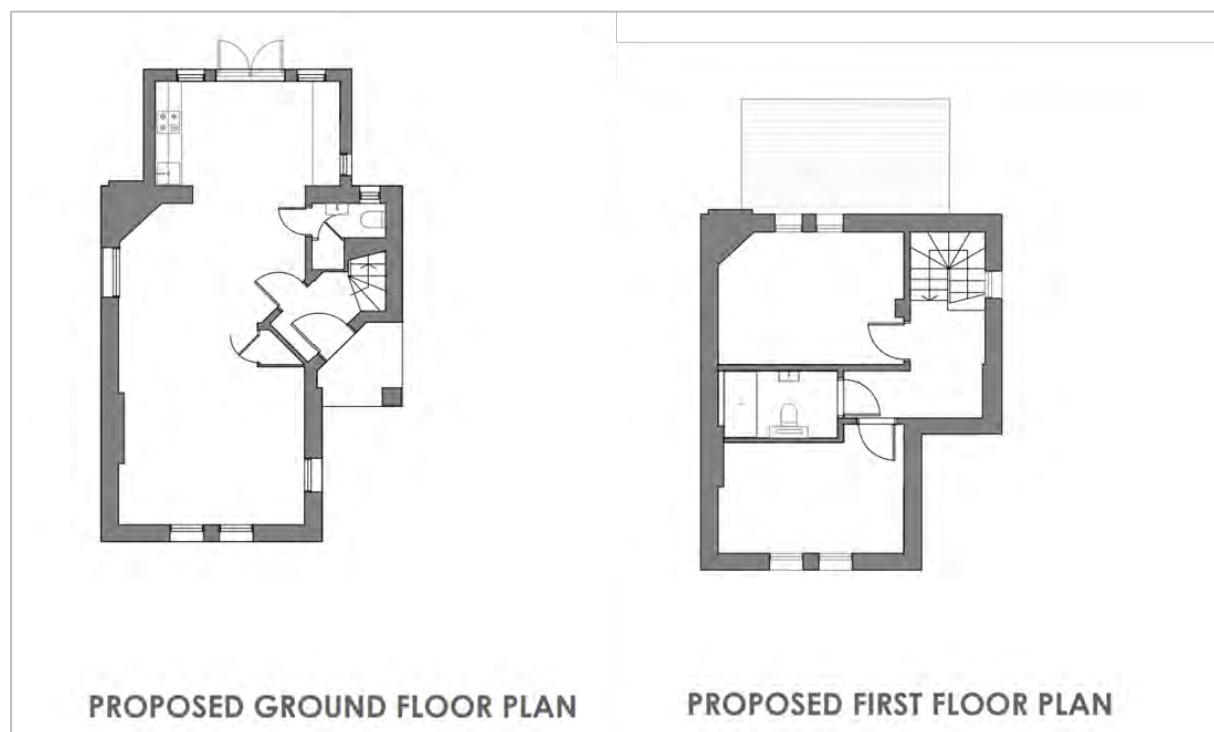
Refurbished – House type 2



Refurbished – House type 3



Refurbished – House type 4



Appendix B

Design Modelling Inputs

The following modelling inputs have been included in the baseline dynamic thermal simulation.

Table B.1: Baseline dynamic thermal modelling design assumptions for the new dwellings			
Data Input			Discussion
Weather data	Location	CIBSE London Weather Centre Design Summer Years (DSYs) for 2020s, high emissions, 50% percentile scenario	As requested by the council of Haringey
Building Fabric Construction details	External walls	0.18 W/m ² K	As per the Energy Statement (Hodkinson Consultancy, June 2022)
	Roofs	0.10 W/m ² K	As per the Energy Statement (Hodkinson Consultancy, June 2022)
	Ground floor	0.10 W/m ² K	As per the Energy Statement (Hodkinson Consultancy, June 2022)
	Ceilings/floors	Assumed to be adiabatic between adjacent floors	Concrete slabs will add to the thermal capacity of the building When dwelling units above / below heat loss is assumed to be zero
	Party walls between units and houses	Assumed to be adiabatic between adjacent dwellings	Walls adjacent to other units are assumed to be lightweight partitions Adjacent units have been included in the dynamic simulation calculations
	Partitions within units	Plasterboard partitions	Assumed thicknesses as per drawings
	Internal doors	0.90 m width	As per drawings (d+b studios, 2022)
Windows	Windows and Glazed Doors	U value 1.1 W/m ² K G Value 0.4	As per the Energy Statement (Hodkinson Consultancy, June 2022)
	Reveal depth	External reveal: 250 mm	As per the agreement with d+b studios.
	Discharge Coefficient	Discharge coefficient: 0.55-0.61	Calculated from window dimensions as per drawings (d+b studios, 2022)
Infiltration	Air Tightness	3.0 m ³ /hr-m ² @ 50 pascals	As per the Energy Statement (Hodkinson Consultancy, June 2022)

Table B.2: Baseline dynamic thermal modelling design assumptions for the Refurbished houses

Data Input			Discussion
Weather data	Location	CIBSE London Weather Centre Design Summer Years (DSYs) for 2020s, high emissions, 50% percentile scenario	<i>As requested by the council of Haringey</i>
Building Fabric Construction details	External walls	0.55 W/m ² K	<i>As per the Energy Statement (Hodkinson Consultancy, 2022)</i>
	Roofs	0.11 W/m ² K	<i>As per the Energy Statement (Hodkinson Consultancy, June 2022)</i>
	Ground floor	0.40 W/m ² K	<i>As per the Energy Statement (Hodkinson Consultancy, June 2022)</i>
	Ceilings/floors	Assumed to be adiabatic between adjacent floors	<i>Concrete June slabs will add to the thermal capacity of the building When dwelling units above / below heat loss is assumed to be zero</i>
	Party walls between units and houses	Assumed to be adiabatic between adjacent dwellings	<i>Walls adjacent to other units are assumed to be lightweight partitions Adjacent units have been included in the dynamic simulation calculations</i>
	Partitions within units	Plasterboard partitions	<i>Assumed thicknesses as per drawings</i>
	Internal doors	0.90 m width	<i>As per drawings (d+b studios, 2022)</i>
Windows	Windows and Glazed Doors	Front windows: U value 2.7 W/m ² K Rear windows: U value 1.4 W/m ² K G value of 0.5	<i>As per the Energy Statement (Hodkinson Consultancy, June 2022)</i>
	Reveal depth	External reveal: 250 mm	<i>As per the agreement with d+b studios.</i>
	Discharge Coefficient	Discharge coefficient: 0.55-0.61	<i>Calculated from window dimensions as per drawings (d+b studios, 2022)</i>
Infiltration	Air Tightness	8.0 m ³ /hr-m ² @ 50 pascals	<i>As per the Energy Statement (Hodkinson Consultancy, June 2022)</i>

For the pre refurbishment tests the following values were used:

- > 2.10 W/m²K for external walls
- > 2.30 W/m²K for roofs
- > 0.60 W/m²K for floors
- > 4.85 W/m²K and a g value of 0.85 for glazing

The following occupancy schedules and internal gains assumptions have been used, in accordance with CIBSE TM59 guidance.

Table B.3: Occupancy and equipment gains for dwellings (CIBSE TM59)		
Unit/room type	Occupancy	Equipment Load
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
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
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
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	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
Utility cupboard	N/A	10 W on 24/7

For new dwellings a mechanical ventilation system should be provided which can achieve background mechanical ventilation rates exceeding minimum Part F requirements. For House type 5 the 2ach are required for bedrooms only.

Appendix C

Result of DSY2 and DSY3 Weather Scenarios

The dynamic overheating assessment has also been run under the more extreme DSY2 and DSY3 weather files, with results presented in Tables C.1 and C.2 for the new dwellings and Tables C.3 and C.4 for the refurbished.

TM59 states that compliance should be met for the DSY1 weather scenario, and that additional testing can be undertaken using the 2020 versions of DSY2 and DSY3. However, it is acknowledged that meeting the CIBSE compliance criteria is challenging for the DSY2 and DSY3 weather files.

The overheating mitigation strategy presented within the main body of this report demonstrates the passive measures that have been implemented to reduce the risk of overheating as far as practicable. In the future, residents could use further adaptation measures to combat any additional overheating risk such as the use of fans or blinds. It is worth noting that although all bedrooms fail criteria B, the majority of zones comply with criteria A which uses a more adaptive approach to assessing overheating.

In accordance with the Building Regulations requirements, residents will be provided with a Home User Guide which will include a section on 'Staying cool in hot weather' which will provide non-technical advice on how to keep the dwelling cool in hot weather. This will be prepared for distribution to residents at handover.

Table C.1: New Dwellings overheating results for DSY2 2020s – TM59

Unit	Room	TM59 Criterion A (pass ≤ 3 %)	TM59 Criterion B (pass ≤ 32)	Compliance
House 5	Kitchen	0.5	N/A	Pass
	Living	0.6	N/A	Pass
	Bedroom1	0.6	46	Fail
	Bedroom2	0.7	46	Fail
Corner Pavilion 0F	Bedroom1	0.1	45	Fail
	Bedroom2	0.6	34	Fail
	LKD	1.1	N/A	Pass
Corner Pavilion 1F	Bedroom1	0.1	32	Fail
	Bedroom2	0.7	34	Fail
	LKD	1.1	N/A	Pass
Apartment Building				
0F - 1-Bed- Northeast	Bedroom	0.3	44	Fail
	LKD	0.8	N/A	Pass
0F - 1-Bed - Northwest	Bedroom	0.5	50	Fail

Unit	Room	TM59 Criterion A (pass ≤ 3 %)	TM59 Criterion B (pass ≤ 32)	Compliance
	LKD	0.5	N/A	Pass
0F - 1-Bed - Southeast	Bedroom	0.5	44	Fail
	LKD	0.6	N/A	Pass
0F - Studio - East	Studio	0.4	32	Pass
0F - Studio - West	Studio	0.6	37	Fail
0F - Studio - Southwest	Studio	0.1	54	Fail
1F - 1-Bed - Northeast	Bedroom	0.3	45	Fail
	LKD	0.6	N/A	Pass
1F - 1-Bed - Northwest	Bedroom	0.4	50	Fail
	LKD	0.5	N/A	Pass
1F - 1-Bed - Southeast	Bedroom	0.5	42	Fail
	LKD	0.6	N/A	Pass
1F - 1-Bed - Southwest	Bedroom	0.6	42	Fail
	LKD	1.0	N/A	Pass
1F - Studio - East	Studio	0.5	31	Pass
1F - Studio - West	Studio	0.6	37	Fail
2F - 1-Bed - Southeast	Bedroom	0.5	43	Fail
	LKD	0.6	N/A	Pass
2F - 1-Bed - Southwest	Bedroom	0.6	41	Fail
	LKD	1.0	N/A	Pass
2F - Studio - East	Studio	0.4	31	Pass
2F - Studio - West	Studio	0.6	37	Fail

Table C.2: New Dwelling overheating results for DSY3 2020s – TM59

Unit	Room	TM59 Criterion A (pass ≤ 3 %)	TM59 Criterion B (pass ≤ 32)	Compliance
House 5	Kitchen	0.0	N/A	Pass
	Living	0.0	N/A	Pass
	Bedroom1	0.2	37	Fail
	Bedroom2	0.3	42	Fail
Corner Pavilion 0F	Bedroom1	0.0	43	Fail
	Bedroom2	0.2	35	Fail
	LKD	0.2	N/A	Pass
Corner Pavilion 1F	Bedroom1	0.0	27	Pass
	Bedroom2	0.2	33	Fail

Unit	Room	TM59 Criterion A (pass ≤ 3 %)	TM59 Criterion B (pass ≤ 32)	Compliance
	LKD	0.2	N/A	Pass
Apartment Building				
0F - 1-Bed - Northeast	Bedroom	0.0	41	Fail
	LKD	0.0	N/A	Pass
0F - 1-Bed - Northwest	Bedroom	0.0	48	Fail
	LKD	0.0	N/A	Pass
0F - 1-Bed - Southeast	Bedroom	0.0	40	Fail
	LKD	0.0	N/A	Pass
0F - Studio - East	Studio	0.0	30	Pass
0F - Studio - West	Studio	0.1	33	Fail
0F - Studio - Southwest	Studio	0.0	42	Fail
1F - 1-Bed - Northeast	Bedroom	0.0	39	Fail
	LKD	0.0	N/A	Pass
1F - 1-Bed - Northwest	Bedroom	0.0	45	Fail
	LKD	0.0	N/A	Pass
1F - 1-Bed - Southeast	Bedroom	0.1	37	Fail
	LKD	0.0	N/A	Pass
1F - 1-Bed - Southwest	Bedroom	0.2	34	Fail
	LKD	0.1	N/A	Pass
1F - Studio - East	Studio	0.0	29	Pass
1F - Studio - West	Studio	0.1	33	Fail
2F - 1-Bed - Southeast	Bedroom	0.1	35	Fail
	LKD	0.0	N/A	Pass
2F - 1-Bed - Southwest	Bedroom	0.2	33	Fail
	LKD	0.1	N/A	Pass
2F - Studio - East	Studio	0.0	28	Pass
2F - Studio - West	Studio	0.1	32	Pass

Table C.3: Refurbished Houses overheating results for DSY2 2020s – TM59

Block	Zone	Criterion A (%)	Criterion B (hr)	Pass/Fail
House Type 1	LKD	1.4	N/A	Pass
	Bedroom	1.5	91	Fail
House Type 2	Living	1.4	N/A	Pass
	LKD	1.3	N/A	Pass
	Bedroom 1	1.4	60	Fail

Block	Zone	Criterion A (%)	Criterion B (hr)	Pass/Fail
	Bedroom 2	1.5	67	Fail
House Type 3	LKD	1.6	N/A	Pass
	Study	1.4	N/A	Pass
	Bedroom 1	1.6	85	Fail
	Bedroom 2	1.9	103	Fail
	Bedroom 3	1.8	82	Fail
House Type 4	LKD	1.6	N/A	Pass
	Bedroom 1	1.8	52	Fail
	Bedroom 2	1.1	44	Fail

Table C.4: Refurbished Houses overheating results for DSY3 2020s – TM59

Block	Zone	Criterion A (%)	Criterion B (hr)	Pass/Fail
House Type 1	LKD	1.6	N/A	Pass
	Bedroom	1.8	88	Fail
House Type 2	Living	1.2	N/A	Pass
	LKD	1.3	N/A	Pass
	Bedroom 1	1.5	75	Fail
	Bedroom 2	1.6	83	Fail
House Type 3	LKD	1.6	N/A	Pass
	Study	1.5	N/A	Pass
	Bedroom 1	1.8	73	Fail
	Bedroom 2	1.9	96	Fail
	Bedroom 3	1.8	75	Fail
House Type 4	LKD	1.8	N/A	Pass
	Bedroom 1	2.2	56	Fail
	Bedroom 2	1.5	45	Fail