



**Sustainable  
Construction  
Services**

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**College Road**

**Thermal Comfort Report**

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SCS Ref: 32360

For:

**Hill**

Prepared by:

Nanda Nambiar

**Sustainable Construction Services**

### Revision record

Description	Version	Date	By	Reviewed
Thermal Comfort Report	V1	04/01/2024	NN	TW
Thermal Comfort Report	V2	26/01/2024	NN	AW
Thermal Comfort Report	V3	05/02/2024	NN	AW

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## EXECUTIVE SUMMARY

The purpose of this report is to convey the results from the analysis of the environmental performance of Dwellings within West Car Park, College Road, Bristol. Specifically this report summarises the work undertaken to review the level of overheating that may occur in spaces that are regularly occupied for significant periods of time.

The proposed development comprises a number of residential dwellings. A natural ventilation strategy is proposed for the occupied spaces, with background mechanical ventilation via Mechanical Ventilation Heat Recovery (MVHR) units. The temperature conditions occurring in these spaces have been compared against the standards described in the CIBSE TM59 document 'methodology for the assessment of overheating risk in homes'.

In summary, based on the details modelled in this report, and a typical summer scenario, compliance with TM59/ Part O targets have been met for all spaces when assessed against the DSY1 2020 50% high emissions and DSY1 2050 50% medium emissions weather files.

The results show that the rooms get warmer when assessed under more extreme design weather years, which is to be expected.

A few rooms fail the Bedroom criterion when assessed against the 2080 weather file scenario. Future retrofit measures have been suggested to enable the spaces to meet the required criteria.

It should be noted that the current assessment does not include for internal blinds or curtains since these can vary considerably in performance and are normally installed by the occupant. Additionally, these are to be excluded as per Part O guidance.

This analysis has been undertaken using the detailed dynamic thermal simulation program ApacheSIM (IESVE, 2023) to predict the building's environmental performance.

There are a number of assumptions made in this report that should be carefully reviewed when using these results to determine design strategies for the proposed building going forward. Details relating to façade openings, internal gains, occupancies and building fabric details are all critical in determining the thermal comfort conditions occurring in each space so should be scrutinised appropriately to ensure any simulation of the building is an accurate reflection of the conditions likely to occur in each space when the building is in use.

There are a number of limitations in the modelling associated with the outputs in this report. In some cases window openings have been set to open at a given temperature, where in reality, their ability to open is solely reliant upon the occupants in the room. It is highly likely that some windows will be opened sooner and some will be opened later. Computer modelling cannot truly represent the actions (or inaction) of people.

Finally, it is important to consider that benchmarks set out in the legislation referred to in analysis cannot truly measure whether an individual will be "comfortable". The analysis can only ever be read as guidance and should never be seen as an absolute guarantee of either performance or comfort. At best it should be seen as an indicator of what many people might think, most of the time.

Therefore, it is recommended that the client for this project should try to understand this report, seek advice from the design team and review their own thoughts on comfort levels. Only once this has occurred will the client be in a position to decide on whether the level of comfort indicated in this report is likely to be acceptable once the building is in operation.

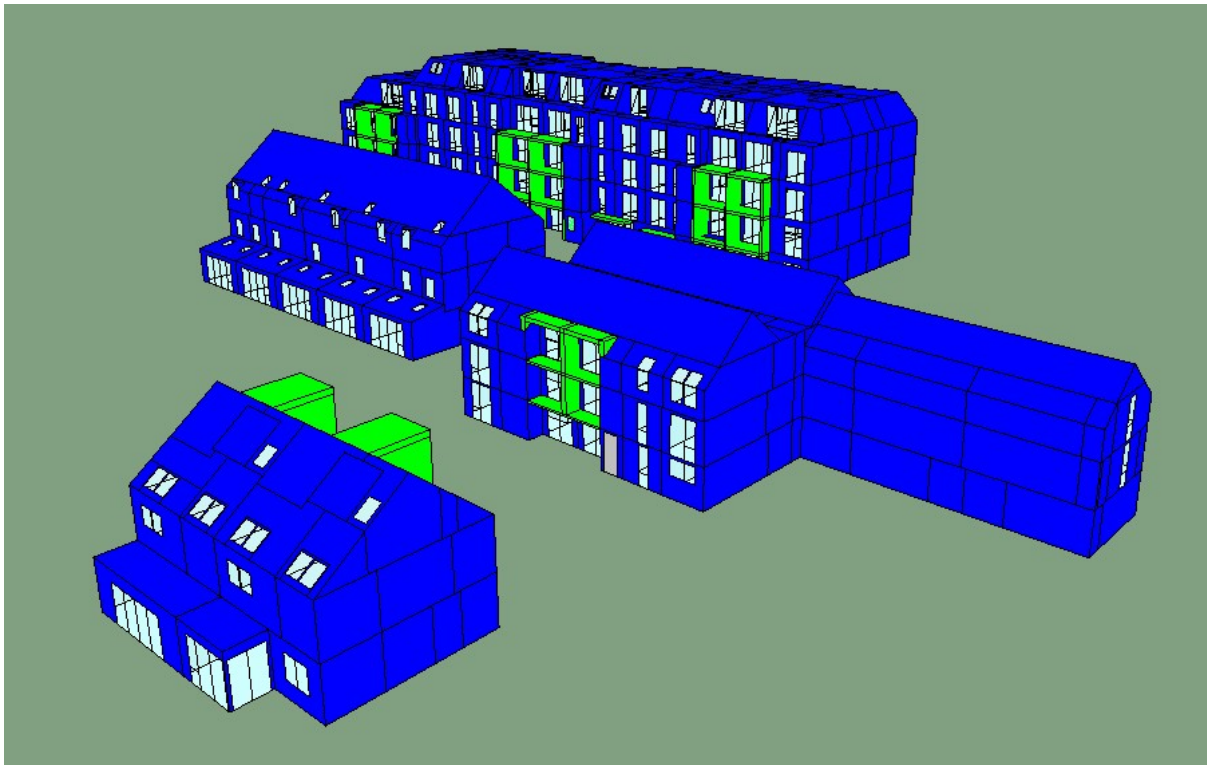
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## 1. INTRODUCTION

The purpose of this report is to convey the results from the analysis of the environmental performance of Dwellings within West Car Park, College Road, Bristol. Specifically this report summarises the work undertaken to review the level of overheating that may occur in spaces that are regularly occupied for significant periods of time.

The proposed development comprises a number of residential dwellings. A natural ventilation strategy is proposed for the occupied spaces, with background mechanical ventilation via Mechanical Ventilation Heat Recovery (MVHR) units. Temperature conditions occurring in these spaces have been compared against the standards described in the CIBSE TM59 document 'methodology for the assessment of overheating risk in homes'.



*Figure 1: IES model screenshot of the proposed development*

## 2. METHODOLOGY

### 2.1 SOFTWARE

The analysis summarised in this report has been performed using IES software which provides full dynamic thermal analysis. This analysis has been carried out in accordance with user instructions set out in IES manuals and CIBSE AM11 Building Energy and Environmental Modelling.

Where possible, modelling data and inputs have been taken from the architectural drawings, supplementary data (detailing the construction materials and the ventilation strategy) or written instructions from the design team. Where no data has been provided, outline estimations have been made and recorded in this document for review and analysis.

This analysis has been undertaken using the detailed dynamic thermal simulation program ApacheSIM (IESVE, 2023) to predict the building's environmental performance.

Solar Penetration Analysis was performed using SunCast (IESVE, 2023). SunCast enhances the thermal analysis by its prediction of solar gains, using the geometric relationship between the proposed building and the sun. SunCast also takes into consideration and shading associated with adjacent buildings and landscape features.

Bulk airflow models (Macroflo), within the IES software suite, were used to predict ventilation rates from openable windows.

### 2.2 WEATHER FILE SELECTION

The latest CIBSE weather files have been selected based on TM59 recommended 2020's CIBSE Design Summer Year (DSY) dataset. As part of this dataset there are three separate DSY scenarios available for various sites in the UK which represent the following:

- DSY 1 – Moderate
  - Represents a moderately warm summer year.
- DSY 2 – Intense
  - Represents a warming event about the same length as the moderate summer year but with a greater intensity.
- DSY 3 – Long
  - Represents a year with a less intense extreme than the DSY 2 but more intense extreme than DSY 1 and lasting for a longer duration.

Best guidance suggests that for the purposes of modelling currently proposed developments as a minimum the DSY1 2020's weather files should be tested against.

TM59 states that the minimum requirement is that a DSY1 weather file should be used. This is the primary condition modelled in this study.

Guidance in TM59 suggests modelling of future weather files should only occur in circumstances where the client deems it appropriate, or they have a particular concern such as vulnerable occupants.

As part of the Bristol Council requirement, all units will be tested for Part O compliance against the DSY1 2050 weather file.

Additionally, the spaces are also to be tested against the 2080 weather file and should the spaces fail to achieve Part O compliance, future retrofit measures are to be suggested.

The following weather data set has been selected as per CIBSE Guidance TM59 and the Bristol Council requirement:

- Cardiff DSY1 2020 50% High Emissions
- Cardiff DSY 1 2050 50% Medium Emissions
- Cardiff DSY 1 2080 50% Medium Emissions

## 2.3 CIBSE TM59 GUIDANCE / APPROVED DOCUMENT PART O

The 2017 CIBSE TM59 document 'Design methodology for the assessment of overheating risk in homes' is the main point of reference for establishing the overheating criteria used in this report. The contents of this document set out a standardised approach to predicting overheating risk for residential building design using dynamic thermal analysis.

This document provides a few assumptions associated with internal gains and occupancy usage patterns to enable a common approach across the industry. The details modelled in this study relating these aspects are provided for reference in this report (see Section 3 & Appendix 2).

TM59 sets out different thermal comfort assessment criteria depending on the room function type and the ventilation strategy in each space. The different criteria are set out below:

### 2.3.1 Criteria for Homes Predominantly Naturally Ventilated

- a) For living rooms, kitchens and bedrooms: the number of hours during which operative temperature 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. (CIBSE TM52 Criterion 1: Hours of exceedance).(see section 2.4 for more detail)
- a) For bedrooms only: to guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10 pm to 7 am shall not exceed 26 °C for more than 1% of annual hours. (Note: 1% of the annual hours between 22:00 and 07:00 for bedrooms is 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 passed for all relevant rooms.



### 2.3.2 Criteria for Homes Predominantly Mechanically Ventilated

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For homes with restricted window openings, the CIBSE fixed temperature test must be followed, i.e. all occupied rooms should not exceed an operative temperature of 26 °C for more than 3% of the annual occupied annual hours (CIBSE Guide A [2015a]).

### 2.3.3 Criteria for Corridors

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TM59 states that the overheating test for corridors should be based on the number of annual hours for which an operative temperature of 28 °C is exceeded. Whilst there is no mandatory target, if an operative temperature of 28 °C is exceeded for more than 3% of total annual hours, this should be flagged as a significant risk within the report.

### 2.3.4 Approved Document Part O – Limits on TM59

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Approved Document Part O assessment is a new planning requirement for residential developments. It essentially follows the TM59 guidance with a few limits.

The limits on CIBSE TM59 modelling are detailed below:

‘a. When a room is occupied during the day (8am to 11pm), openings should be modelled to do all of the following:

- i. Start to open when the internal temperature exceeds 22°.
  - ii. Be fully open when the internal temperature exceeds 26°.
  - iii. Start to close when the internal temperature falls below 26°.
  - iv. Be fully closed when the internal temperature falls below 22°C.
- b. At night (11pm to 8am), openings should be modelled as fully open if both of the following apply.
- i. The opening is on the first floor or above and not on easily accessible.
  - ii. The internal temperature exceeds 23°C at 11pm.
- c. When a ground floor or easily accessible room is unoccupied, both of the following apply.
- i. In the day, windows, patio doors and balcony doors should be modelled as open, if this can be done securely.
  - ii. At night, windows, patio doors and balcony doors should be modelled as closed.
- d. An entrance door should be included, which should be shut at all time.’

Additionally, internal blinds and curtains should not be included in the Part O assessment

## 2.4 TM52: ADAPTIVE THERMAL COMFORT CRITERIA

Overheating within the occupied spaces in this building have been evaluated against the first criterion set out within CIBSE TM52 'The Limits of Thermal Comfort: Avoiding Overheating in European Buildings'.

Rather than purely focussing on the number of hours 'out of range', TM52 looks at how likely someone is to be "comfortable". Simplistically this is trying to estimate what most people might feel, most of the time. All 'occupied' rooms within the proposed building have been analysed in this study occupied rooms are typically those occupied for more than 30 minutes at a time.

Although there are three criteria that CIBSE TM52 assesses, section 4.2 of TM59 states that compliance only needs to be met with TM52 Criterion 1, a description of this criterion is provided below:

A brief description of each of the three TM52 criteria are as follows:

### 2.4.1 Criterion 1

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The first criterion sets a limit for the number of hours that the operative temperature can exceed the threshold comfort temperature (upper limit of the range of comfort temperature) by 1 K (i.e. 1 °C) or more during the occupied hours of a typical non-heating season (1 May to 30 September).

### 2.4.2 Criterion 2

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The second criterion deals with the severity of overheating within any one day, which can be as important as its frequency, the level of which is a function of both temperatures rise and its duration. This criterion sets a daily limit for acceptability. This performance is calculated using a non-linear, non-unitised calculation that is derived from each day's temperature data. The calculation produces a score, and if this score is below the numerical number of six, compliance with this criterion is achieved.

The figure of six was derived from research and statistical analysis of the data to define what most people thought was acceptable most of the time.

### 2.4.3 Criterion 3

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The third criterion sets an absolute maximum daily temperature for a room, beyond which the level of overheating is unacceptable.

## 2.5 RELEVANCE OF RESULTS

Fundamentally it is important to consider that TM52 or CIBSE Guide A benchmarks cannot truly measure whether an individual will be “comfortable”.

As we are all individuals, by default you cannot predict how one individual will react to internal environmental conditions. Gender, age, health, mental state and familiarity with the space all affect the perception of comfort.

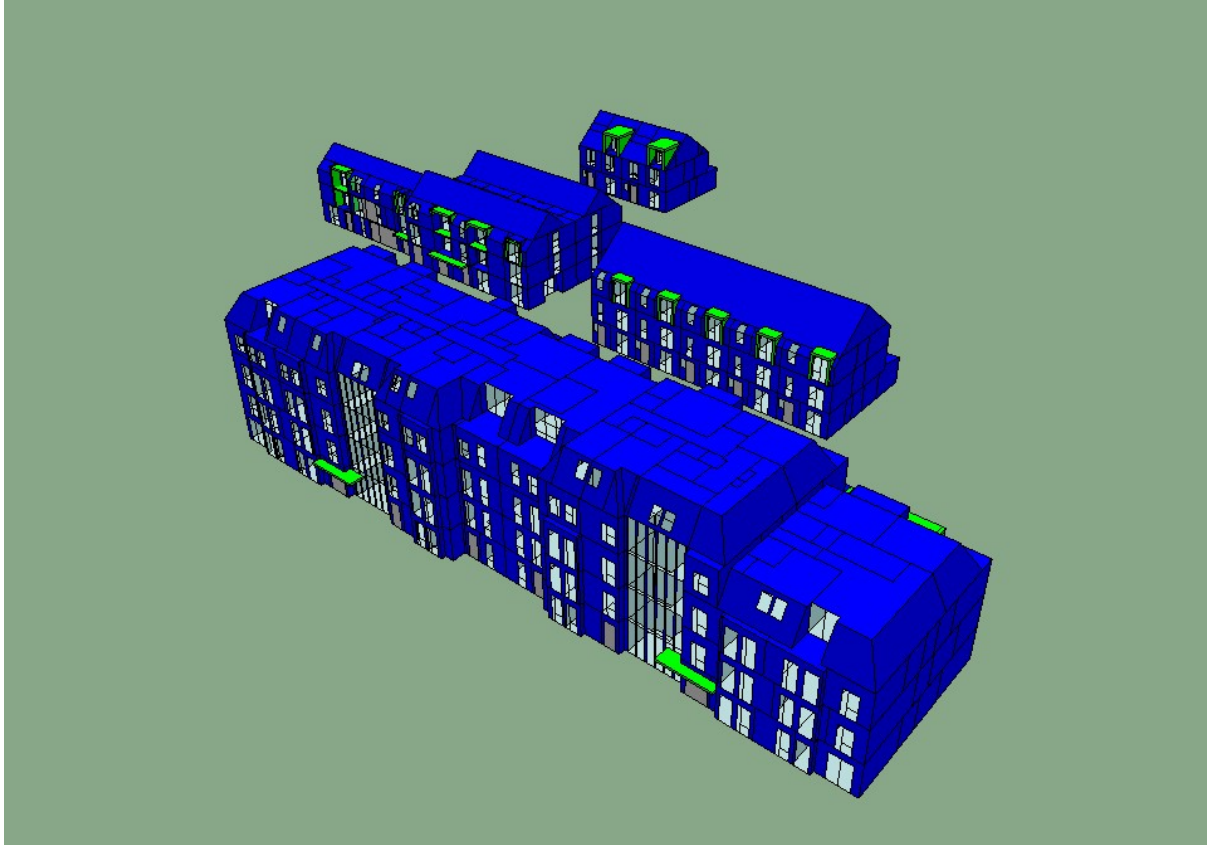
Furthermore, the modelling is undertaken using weather data that has been derived from historic weather data and adjusted to represent a “warm year”. Therefore, it can never truly mimic future levels of occupancy, accurately portray how the building was actually built or accurately predict the weather using future data.

The analysis can only ever be read as guidance and should never be seen as an absolute guarantee of either performance or comfort. At best it should be seen as an indicator of what many people might think, most of the time.

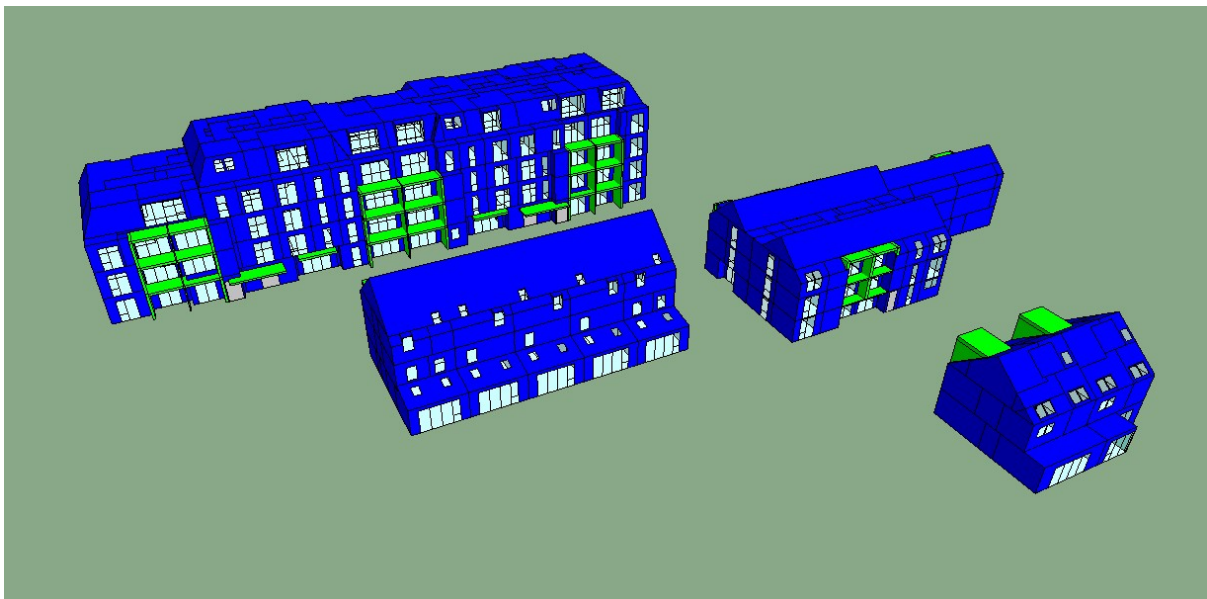
Therefore it is recommended that the client for this project should try to understand this report, seek advice from the design team and review their own thoughts on comfort levels. Only once this has occurred will the client be able to decide on whether the level of comfort indicated in this report is likely to be acceptable once the building is in operation.

## 3. MODELLING DATA

### 3.1 MODEL IMAGES



*Figure 2: IES model screenshot (View from North)*



*Figure 3: IES model screenshot (View from West)*

## 3.2 BASIC THERMAL MODELLING ASSUMPTIONS

### 3.2.1 Internal Gains

A number of internal gains have been applied to the spaces within our model. Refer to Appendix 1 of this document where a summary of the details associated with each gain type and how they have been incorporated into the model have been placed in a table.

The information relating to these internal gains, including the occupancy profiles associated with each, have been derived by either appropriate industry conventions (i.e. TM59), experience on modelling buildings of a similar type, or from information provided by the design team.

It is important to note that although best practice TM59 guidelines regarding occupancy usage profiles have been followed in this study, this cannot accurately reflect likely occupancy patterns across the flats in reality. For example TM59 recommends that a 24-hour occupancy profile is applied in bedrooms, although this allows for continual internal gains occurring in the space, it also means that an occupant is present to open and close the windows. In reality it is likely that bedrooms could remain completely unoccupied during the day with the windows closed.

It is difficult to account for every eventuality in computer modelling, however logic dictates that if any occupant enters a space that is perceived as too warm they will subsequently open windows to alleviate the situation.

### 3.2.2 Openings

Another important aspect of the model relates to profiles and openable areas that have been set for the windows and doors. Following CIBSE TM59 guidance and discussions with the architect, we created the different window profiles shown below.

Firstly recessed windows will not provide the same degree of free openable area when compared with windows flush to the façade and this must be considered when reading this report. As the diagram below illustrates, this recess could significantly lower the total effective free area of a window. To incorporate this a percentage reduction will be added to the opening area for windows and doors based on the extent of the reveals and other obstructions.

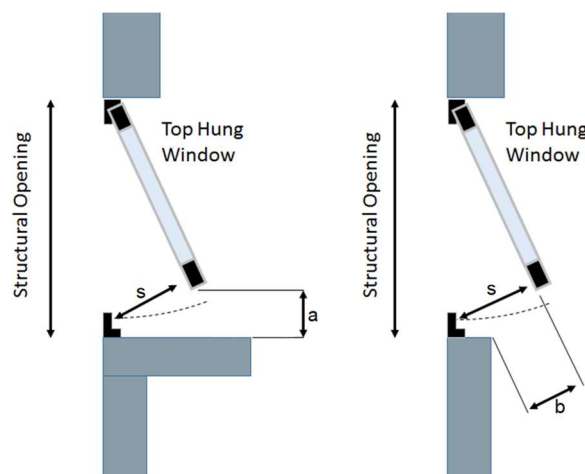


Figure 4: Example of effective free opening area reduced by protrusion of window sill (from BBIO1 figure 8-1).

The equivalent area of the windows was calculated using the BBIOI discharge coefficient calculator, in line with Part O guidance, Appendix D. As it states that the equivalent area of a window can be calculated using one of the following.

- a. The discharge coefficient calculator, available online at: <https://www.gov.uk/government/publications/classvent-and-classcool-school-ventilation-design-tool>.
- b. Tables D1 to D9 in Approved Document O: Overheating.

In line with Part L, Part O and Part K, openable windows below 1100mm would need to be restricted. Since many of the openable panels are located below 1100mm, 100mm restrictors were modelled, apart for a few windows where the Sil Height was above 1100mm.

Internal doors were modelled as openable during the day in the two units within Mews Terrace 2.

**The rooflights needed to be openable in several spaces as detailed in the table below and appendix 2.**

Opening Type Ref	Width (mm)	Height (mm)	Area (m <sup>2</sup> )	Opening Restriction mm	Openable Area %	Profile Active Hours
Top Hung - 750x750(650mm) BED	750	750	0.56	650mm	44.80%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 750x750(650mm) LKD	750	750	0.56	650mm	44.80%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 900x1600(100mm) BED	900	1600	1.44	100mm	11.10%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 900x1600(100mm) LKD	900	1600	1.44	100mm	11.10%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 700x1600(100mm) LKD	700	1600	1.12	100mm	13.10%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 700x1600(100mm) BED	700	1600	1.12	100mm	13.10%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 750x1500(100mm) BED	750	1500	1.13	100mm	14.20%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 750x1500(100mm) LKD	750	1500	1.13	100mm	14.20%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%

Opening Type Ref	Width (mm)	Height (mm)	Area (m <sup>2</sup> )	Opening Restriction mm	Openable Area %	Profile Active Hours
Top Hung - 750x1600(100mm) BED	750	1600	1.20	100mm	13.50%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 750x1600(100mm) LKD	750	1600	1.20	100mm	13.50%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 750x1100(100mm) LKD	750	1100	0.83	100mm	14.50%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 750x1100(100mm) BED	750	1100	0.83	100mm	14.50%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 750x1200(100mm) LKD	750	1200	0.90	100mm	13.80%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 750x1200(100mm) BED	750	1200	0.90	100mm	13.80%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 750x1300(100mm) LKD	750	1300	0.98	100mm	12.60%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 750x1300(100mm) BED	750	1300	0.98	100mm	12.60%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 900x1300(100mm) LKD	900	1300	1.17	100mm	13.40%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 900x1300(100mm) BED	900	1300	1.17	100mm	13.40%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Side Hung - 700x2400(90°) LKD	700	2400	1.68	90°	54.30%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Side Hung - 700x2400(90°) BED	700	2400	1.68	90°	54.30%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Side Hung - 900x2400(90°) LKD	900	2400	2.16	90°	55.10%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%

Opening Type Ref	Width (mm)	Height (mm)	Area (m <sup>2</sup> )	Opening Restriction mm	Openable Area %	Profile Active Hours
Side Hung - 900x2400(90°) BED	900	2400	2.16	90°	55.10%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 700x1500(100mm) BED	700	1500	1.05	100mm	13.90%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 700x1500(100mm) LKD	700	1500	1.05	100mm	13.90%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 800x1200(650mm) BED	800	1200	0.96	650mm	48.20%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 800x1200(650mm) LKD	800	1200	0.96	650mm	48.20%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 800x1200(650mm) STUDY	800	1200	0.96	650mm	48.20%	1600 to 2200 - 100% *
Top Hung - 800x1200(100mm) STUDY	800	1200	0.96	100mm	13.80%	1600 to 2200 - 100% *
Top Hung - 1000x1600(100mm) BED	1000	1600	1.60	100mm	11.50%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 1000x1600(100mm) LKD	1000	1600	1.60	100mm	11.50%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 650x1600(100mm) BED	650	1600	1.04	100mm	12.70%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 650x1600(100mm) LKD	650	1600	1.04	100mm	12.70%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 700x1000(100mm) BED	700	1000	0.70	100mm	15.30%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 1000x1000(100mm) BED	1000	1000	1.00	100mm	14.20%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *



Opening Type Ref	Width (mm)	Height (mm)	Area (m <sup>2</sup> )	Opening Restriction mm	Openable Area %	Profile Active Hours
Top Hung - 1000x1550(100mm) BED	1000	1550	1.55	100mm	11.80%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 1000x1550(100mm) LKD	1000	1550	1.55	100mm	11.80%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 700x1550(100mm) BED	700	1550	1.09	100mm	13.50%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 700x1550(100mm) LKD	700	1550	1.09	100mm	13.50%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 800x800(30°) BED	800	800	0.64	30°	34.80%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 800x800(30°) LKD	800	800	0.64	30°	34.80%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 700x1000(30°) BED	700	1000	0.70	30°	40.10%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 700x1000(30°) LKD	700	1000	0.70	30°	40.10%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Side Hung - 600x950(100mm) LKD	600	950	0.57	100mm	20.40%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Side Hung - 900x1400(100mm) BED	900	1400	1.26	100mm	16.60%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Side Hung - 900x1400(100mm) STUDY	900	1400	1.26	100mm	16.60%	1600 to 2200 -100% *
Top Hung - 700x1300(100mm) LKD	700	1300	0.91	100mm	15.70%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 700x1300(100mm) BED	700	1300	0.91	100mm	115.70%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *

Opening Type Ref	Width (mm)	Height (mm)	Area (m <sup>2</sup> )	Opening Restriction mm	Openable Area %	Profile Active Hours
Side Hung - 1000x2100(90°) LKD	1000	2100	2.10	90°	60.10%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Side Hung - 1000x2300(90°) LKD	1000	2300	2.30	90°	60.60%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Side Hung - 800x1300(100mm) LKD	800	1300	1.04	100mm	17.90%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Top Hung - 800x1000(100mm) BED	800	1000	0.80	100mm	16.00%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Side Hung - 850x2300(90°) BED	850	2300	1.96	90°	58.00%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Top Hung - 800x1000(100mm) STUDY	800	1000	0.80	100mm	16.00%	1600 to 2200 - 100% *
Sliding Door - 1000x2400(80%) LKD	1000	2400	2.40	80%	80.00%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Sliding Door - 1000x2400(80%) BED	1000	2400	2.40	80%	80.00%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Sliding Door - 1000x2400(80%) BED 10% night	1000	2400	2.40	80%	80.00%	0000 to 0800 -10% * (restricted at night) 0800 to 2300 -100% ** 2300-2400 -10% * (restricted at night)
Sliding Door - 1000x2350(80%) LKD	1000	2350	2.35	80%	80.00%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Sliding Door - 1000x2350(80%) BED	1000	2350	2.35	80%	80.00%	0000 to 0800 -100% * 0800 to 2300 -100% ** 2300-2400 -100% *
Sliding Door - 1000x2100(80%) LKD	1000	2100	2.10	80%	80.00%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%
Folding Door - 1000x2400(80%) LKD	1000	2400	2.40	80%	80.00%	0000 to 0900 -0% 0900 to 2200 -100% ** 2200-2400 -0%

Opening Type Ref	Width (mm)	Height (mm)	Area (m <sup>2</sup> )	Opening Restriction mm	Openable Area %	Profile Active Hours
Internal Living Room Door	900	2100	1.89	-	80.00%	0900 to 2200 - 100% (on continuous)
Internal Bedroom Door	900	2100	1.89	-	80.00%	0700 to 2200 - 100% (on continuous)

\* Open when internal temperature exceed 23°C and internal temperature is greater than outdoor temperature

\*\* Start opening when internal temp exceeds 22°C and be fully open at 26°C; and close in a similar manner

*Table 1: Window opening types and assumptions*

These windows were set to open as per the Part O guidance detailed in section 2.3.4. Windows were only modelled as being openable when the rooms in question are occupied over the course of any given day and in reality these will be manually openable by occupants.

The location of each window type used in the model is outlined in Appendix 2.

### 3.2.3 Mechanical Ventilation

Continuous background extract ventilation is required in the following spaces.

Space Name	Mechanical Extract Boost Rate (l/s)	Mechanical Extract Setback Rate (l/s)
Block A - OF - 1 Bathroom	20.45	16.59
Block A - OF - 1 Bedroom 1 (Double)	18.26	14.96
Block A - OF - 1 Bedroom 2 (Double)	16.65	13.94
Block A - OF - 1 Ensuite Shower/WC	20.45	16.59
Block A - OF - 1 Kitchen	33.23	26.71
Block A - OF - 1 Living/Dining	41.09	32.99
Block A - OF - 1 Utilities	1.88	1.56
Block A - OF - 2 Bathroom	20.45	16.59
Block A - OF - 2 Bedroom 2 (Double)	16.65	13.94
Block A - OF - 2 Bedroom 1 (Double)	18.26	14.96
Block A - OF - 2 Ensuite Shower/WC	20.45	16.59
Block A - OF - 2 Kitchen	33.23	13.94
Block A - OF - 2 Living/Dining	41.09	32.99
Block A - OF - 2 Utilities	1.88	1.59

Space Name	Mechanical Extract Boost Rate (l/s)	Mechanical Extract Setback Rate (l/s)
Block A - OF - 3 Bathroom	20.97	17.01
Block A - OF - 3 Bedroom 1 (Double)	18.26	14.96
Block A - OF - 3 Bedroom 2 (Double)	16.65	13.94
Block A - OF - 3 Ensuite Shower/WC	20.97	17.01
Block A - OF - 3 Kitchen	34.07	27.39
Block A - OF - 3 Living/Dining	41.09	32.99
Block A - OF - 4 Bathroom	20.45	16.59
Block A - OF - 4 Bedroom 1 (Double)	18.26	14.96
Block A - OF - 4 Bedroom 2 (Double)	16.65	13.94
Block A - OF - 4 Ensuite Shower/WC	20.45	16.59
Block A - OF - 4 Kitchen	33.23	26.71
Block A - OF - 4 Living/Dining	41.09	32.99
Block A - OF - 4 Utilities	1.88	1.56
Block A - OF - 5 Bathroom	20.45	16.59
Block A - OF - 5 Bedroom 1 (Double)	18.26	14.96
Block A - OF - 5 Bedroom 2 (Double)	16.65	13.94
Block A - OF - 5 Ensuite Shower/WC	20.45	16.59
Block A - OF - 5 Kitchen	33.23	26.71
Block A - OF - 5 Living/Dining	41.09	32.99
Block A - OF - 5 Utilities	1.88	1.56
Block A - OF - 6 Bathroom	20.97	17.01
Block A - OF - 6 Bedroom 1 (Double)	18.26	14.96
Block A - OF - 6 Bedroom 2 (Double)	16.65	13.94
Block A - OF - 6 Ensuite Shower/WC	20.97	17.01
Block A - OF - 6 Kitchen	34.07	27.39
Block A - OF - 6 Living/Dining	41.09	32.99
Block A - OF - 7 Bathroom	20.45	16.59
Block A - OF - 7 Bedroom 1 (Double)	18.26	14.96
Block A - OF - 7 Bedroom 2 (Double)	16.65	13.94
Block A - OF - 7 Ensuite Shower/WC	20.45	16.59
Block A - OF - 7 Kitchen	33.23	26.71
Block A - OF - 7 Living/Dining	41.09	32.99
Block A - OF - 7 Utilities	1.88	1.59
Block A - OF - 8 Bathroom	20.45	16.59
Block A - OF - 8 Bedroom 1 (Double)	18.26	14.96

Space Name	Mechanical Extract Boost Rate (l/s)	Mechanical Extract Setback Rate (l/s)
Block A - OF - 8 Bedroom 2 (Double)	16.65	13.94
Block A - OF - 8 Ensuite Shower/WC	20.45	16.59
Block A - OF - 8 Kitchen	33.23	26.71
Block A - OF - 8 Living/Dining	41.09	32.99
Block A - OF - 8 Utilities	1.88	1.59
Block A - 1F - 10 Bathroom	20.45	16.59
Block A - 1F - 10 Bedroom 1 (Double)	35.26	14.96
Block A - 1F - 10 Bedroom 2 (Double)	33.65	13.94
Block A - 1F - 10 Ensuite Shower/WC	20.45	16.59
Block A - 1F - 10 Kitchen	33.23	26.71
Block A - 1F - 10 Living/Dining	41.09	32.99
Block A - 1F - 10 Utilities	1.88	1.59
Block A - 1F - 11 Bathroom	27.97	22.69
Block A - 1F - 11 Bedroom 1 (Double)	23.38	19.16
Block A - 1F - 11 Kitchen	45.46	36.54
Block A - 1F - 11 Living/Dining	52.62	42.25
Block A - 1F - 11 Utilities	2.57	2.13
Block A - 1F - 12 Bathroom	27.97	22.69
Block A - 1F - 12 Bedroom 1 (Double)	23.38	19.16
Block A - 1F - 12 Kitchen	45.46	36.54
Block A - 1F - 12 Living/Dining	52.62	42.25
Block A - 1F - 12 Utilities	2.57	2.13
Block A - 1F - 13 Bathroom	20.45	16.59
Block A - 1F - 13 Bedroom 1 (Double)	18.26	14.96
Block A - 1F - 13 Bedroom 2 (Double)	16.65	13.94
Block A - 1F - 13 Ensuite Shower/WC	20.45	16.59
Block A - 1F - 13 Kitchen	33.23	26.71
Block A - 1F - 13 Living/Dining	41.09	32.99
Block A - 1F - 13 Utilities	1.88	1.59
Block A - 1F - 14 Bathroom	20.45	16.59
Block A - 1F - 14 Bedroom 1 (Double)	18.86	14.96
Block A - 1F - 14 Bedroom 2 (Double)	16.65	13.94
Block A - 1F - 14 Ensuite Shower/WC	20.45	16.59
Block A - 1F - 14 Kitchen	33.23	26.71
Block A - 1F - 14 Living/Dining	41.09	32.99

Space Name	Mechanical Extract Boost Rate (l/s)	Mechanical Extract Setback Rate (l/s)
Block A - 1F - 14 Utilities	1.88	1.59
Block A - 1F - 15 Bathroom	20.45	16.59
Block A - 1F - 15 Bedroom 1 (Double)	35.26	14.96
Block A - 1F - 15 Bedroom 2 (Double)	33.65	13.94
Block A - 1F - 15 Ensuite Shower/WC	20.45	16.59
Block A - 1F - 15 Kitchen	33.23	26.71
Block A - 1F - 15 Living/Dining	41.09	32.99
Block A - 1F - 15 Utilities	1.88	1.59
Block A - 1F - 16 Bathroom	27.97	22.69
Block A - 1F - 16 Bedroom1 (Double)	23.39	19.16
Block A - 1F - 16 Kitchen	45.46	36.54
Block A - 1F - 16 Living/Dining	52.62	42.25
Block A - 1F - 16 Utilities	2.57	2.13
Block A - 1F - 17 Bathroom	20.45	16.59
Block A - 1F - 17 Bedroom 1 (Double)	18.26	14.96
Block A - 1F - 17 Bedroom 2 (Double)	16.65	13.94
Block A - 1F - 17 Ensuite Shower/WC	20.45	16.59
Block A - 1F - 17 Kitchen	33.23	26.71
Block A - 1F - 17 Living/Dining	41.09	32.99
Block A - 1F - 17 Utilities	1.88	1.56
Block A - 1F - 18 Bathroom	27.97	22.69
Block A - 1F - 18 Bedroom 1 (Double)	23.38	19.16
Block A - 1F - 18 Kitchen	45.46	36.54
Block A - 1F - 18 Living/Dining	52.62	42.25
Block A - 1F - 18 Utilities	2.57	2.13
Block A - 1F - 9 Bathroom	20.45	16.59
Block A - 1F - 9 Bedroom 1 (Double)	18.26	14.96
Block A - 1F - 9 Bedroom 2 (Double)	16.65	13.94
Block A - 1F - 9 Ensuite Shower/WC	20.45	16.59
Block A - 1F - 9 Kitchen	33.23	26.71
Block A - 1F - 9 Living/Dining	41.09	32.99
Block A - 1F - 9 Utilities	1.88	1.56
Block A - 2F - 19 Bathroom	20.45	16.59
Block A - 2F - 19 Bedroom 1 (Double)	18.26	14.96
Block A - 2F - 19 Bedroom 2 (Double)	16.65	13.94

Space Name	Mechanical Extract Boost Rate (l/s)	Mechanical Extract Setback Rate (l/s)
Block A - 2F - 19 Ensuite Shower/WC	20.45	16.59
Block A - 2F - 19 Kitchen	33.23	26.71
Block A - 2F - 19 Living/Dining	41.09	32.99
Block A - 2F - 19 Utilities	1.88	1.56
Block A - 2F - 20 Bathroom	20.45	16.59
Block A - 2F - 20 Bedroom 1 (Double)	18.26	14.96
Block A - 2F - 20 Bedroom 2 (Double)	16.65	13.94
Block A - 2F - 20 Ensuite Shower/WC	20.45	16.59
Block A - 2F - 20 Kitchen	33.23	26.71
Block A - 2F - 20 Living/Dining	41.09	32.99
Block A - 2F - 20 Utilities	1.88	1.56
Block A - 2F - 21 Bathroom	20.45	16.59
Block A - 2F - 21 Bedroom 1 (Double)	18.26	14.96
Block A - 2F - 21 Bedroom 2 (Double)	16.65	13.94
Block A - 2F - 21 Ensuite Shower/WC	20.45	16.59
Block A - 2F - 21 Kitchen	33.23	26.71
Block A - 2F - 21 Living/Dining	41.09	32.99
Block A - 2F - 21 Utilities	1.88	1.56
Block A - 2F - 22 Bathroom	27.97	22.69
Block A - 2F - 22 Bedroom 1 (Double)	23.38	19.16
Block A - 2F - 22 Kitchen	45.46	36.54
Block A - 2F - 22 Living/Dining	52.62	42.25
Block A - 2F - 22 Utilities	2.57	2.13
Block A - 2F - 23 Bathroom	20.45	16.59
Block A - 2F - 23 Bedroom 1 (Double)	18.26	14.96
Block A - 2F - 23 Bedroom 2 (Double)	16.65	13.94
Block A - 2F - 23 Ensuite Shower/WC	20.45	16.59
Block A - 2F - 23 Kitchen	33.23	26.71
Block A - 2F - 23 Living/Dining	41.09	32.99
Block A - 2F - 23 Utilities	1.88	1.56
Block A - 2F - 24 Bathroom	20.45	16.59
Block A - 2F - 24 Bedroom 1 (Double)	18.26	14.96
Block A - 2F - 24 Bedroom 2 (Double)	16.65	13.94
Block A - 2F - 24 Ensuite Shower/WC	20.45	16.59
Block A - 2F - 24 Kitchen	33.23	26.71

Space Name	Mechanical Extract Boost Rate (l/s)	Mechanical Extract Setback Rate (l/s)
Block A - 2F - 24 Living/Dining	41.09	32.99
Block A - 2F - 24 Utilities	1.88	1.56
Block A - 2F - 25 Bathroom	20.45	16.59
Block A - 2F - 25 Bedroom 1 (Double)	18.26	14.96
Block A - 2F - 25 Bedroom 2 (Double)	16.65	13.94
Block A - 2F - 25 Ensuite Shower/WC	20.45	16.59
Block A - 2F - 25 Kitchen	33.23	26.71
Block A - 2F - 25 Living/Dining	41.09	32.99
Block A - 2F - 25 Utilities	1.88	1.59
Block A - 2F - 26 Bathroom	27.97	22.69
Block A - 2F - 26 Bedroom 1 (Double)	23.38	19.16
Block A - 2F - 26 Kitchen	45.46	36.54
Block A - 2F - 26 Living/Dining	52.62	42.25
Block A - 2F - 26 Utilities	2.57	2.13
Block A - 2F - 27 Bathroom	20.45	16.59
Block A - 2F - 27 Bedroom 1 (Double)	18.26	14.96
Block A - 2F - 27 Bedroom 2 (Double)	16.65	13.94
Block A - 2F - 27 Ensuite Shower/WC	20.45	16.59
Block A - 2F - 27 Kitchen	33.23	26.71
Block A - 2F - 27 Living/Dining	41.09	32.99
Block A - 2F - 27 Utilities	1.88	1.56
Block A - 2F - 28 Bathroom	20.45	16.59
Block A - 2F - 28 Bedroom 1 (Double)	18.26	14.96
Block A - 2F - 28 Bedroom 2 (Double)	16.65	13.94
Block A - 2F - 28 Ensuite Shower/WC	20.45	16.59
Block A - 2F - 28 Kitchen	33.23	26.71
Block A - 2F - 28 Living/Dining	41.09	32.99
Block A - 2F - 28 Utilities	1.88	1.56
Block A - 3F - 29 Bathroom	20.45	16.59
Block A - 3F - 29 Bedroom 1 (Double)	18.26	14.96
Block A - 3F - 29 Bedroom 2 (Double)	16.65	13.94
Block A - 3F - 29 Ensuite Shower/WC	20.45	16.59
Block A - 3F - 29 Kitchen	33.23	26.71
Block A - 3F - 29 Living/Dining	41.09	32.99
Block A - 3F - 29 Utilities	1.88	1.56



Space Name	Mechanical Extract Boost Rate (l/s)	Mechanical Extract Setback Rate (l/s)
Block A - 3F - 30 Bathroom	20.45	16.59
Block A - 3F - 30 Bedroom 1 (Double)	18.26	14.96
Block A - 3F - 30 Bedroom 2 (Double)	16.65	13.94
Block A - 3F - 30 Ensuite Shower/WC	20.45	16.59
Block A - 3F - 30 Kitchen	33.23	26.71
Block A - 3F - 30 Living/Dining	41.09	32.99
Block A - 3F - 30 Utilities	1.88	1.56
Block A - 3F - 31 Bathroom	35.26	16.59
Block A - 3F - 31 Bedroom 1 (Double)	33.65	14.96
Block A - 3F - 31 Bedroom 2 (Double)	16.65	13.94
Block A - 3F - 31 Ensuite Shower/WC	20.45	16.59
Block A - 3F - 31 Kitchen	33.23	26.71
Block A - 3F - 31 Living/Dining	41.09	32.99
Block A - 3F - 31 Utilities	1.88	1.56
Block A - 3F - 32 Bathroom	27.97	22.69
Block A - 3F - 32 Bedroom 1 (Double)	23.38	19.16
Block A - 3F - 32 Kitchen	45.46	36.54
Block A - 3F - 32 Living/Dining	52.62	42.25
Block A - 3F - 32 Utilities	2.57	2.13
Block A - 3F - 33 Bathroom	16.11	13.07
Block A - 3F - 33 Bedroom 1 (Double)	26.31	12.27
Block A - 3F - 33 Bedroom 2 (Double)	24.96	11.43
Block A - 3F - 33 Bedroom 3 (Double)	24.96	11.43
Block A - 3F - 33 Ensuite Shower/WC	16.11	13.07
Block A - 3F - 33 Ensuite Shower/WC	16.11	13.07
Block A - 3F - 33 Kitchen	26.18	21.05
Block A - 3F - 33 Living/Dining	33.7	27.06
Block A - 3F - 33 Utilities	1.48	1.23
Block A - 3F - 34 Bathroom	15.81	12.82
Block A - 3F - 34 Bedroom 1 (Double)	26.28	12.27
Block A - 3F - 34 Bedroom 2 (Double)	24.96	11.43
Block A - 3F - 34 Bedroom 3 (Double)	24.96	11.43
Block A - 3F - 34 Ensuite Shower/WC	15.81	12.82
Block A - 3F - 34 Ensuite Shower/WC	15.81	12.82
Block A - 3F - 34 Kitchen	25.68	20.65

Space Name	Mechanical Extract Boost Rate (l/s)	Mechanical Extract Setback Rate (l/s)
Block A - 3F - 34 Living/Dining	33.7	27.06
Block A - 3F - 34 Utilities	1.45	1.21
Block A - 3F - 34 Utilities	1.45	1.21
Block A - 3F - 35 Bathroom	20.45	16.59
Block A - 3F - 35 Bedroom 1 (Double)	35.26	14.96
Block A - 3F - 35 Bedroom 2 (Double)	33.65	13.94
Block A - 3F - 35 Ensuite Shower/WC	20.45	16.59
Block A - 3F - 35 Kitchen	33.23	26.71
Block A - 3F - 35 Living/Dining	41.09	32.99
Block A - 3F - 35 Utilities	1.88	1.56
Block A - 3F - 36 Bathroom	27.97	22.69
Block A - 3F - 36 Bedroom 1 (Double)	23.38	19.16
Block A - 3F - 36 Kitchen	45.46	36.54
Block A - 3F - 36 Living/Dining	52.62	42.25
Block A - 3F - 36 Utilities	2.57	2.13
Block A - 3F - 37 Bathroom	20.45	16.59
Block A - 3F - 37 Bedroom 1 (Double)	18.26	14.96
Block A - 3F - 37 Bedroom 2 (Double)	16.65	13.94
Block A - 3F - 37 Ensuite Shower/WC	20.45	16.59
Block A - 3F - 37 Kitchen	33.23	26.71
Block A - 3F - 37 Living/Dining	41.09	32.99
Block A - 3F - 37 Utilities	1.88	1.56
Block A - 4F - 38 Bathroom	16.11	13.07
Block A - 4F - 38 Bedroom 1 (Double)	26.28	12.27
Block A - 4F - 38 Bedroom 2 (Double)	24.96	11.43
Block A - 4F - 38 Bedroom 3 (Single)	24.96	11.43
Block A - 4F - 38 Ensuite Shower/WC	16.11	13.07
Block A - 4F - 38 Ensuite Shower/WC	16.11	13.07
Block A - 4F - 38 Kitchen	26.18	21.05
Block A - 4F - 38 Living/Dining	33.7	27.06
Block A - 4F - 38 Utilities	1.48	1.23
Block A - 4F - 39 Bathroom	20.97	17.01
Block A - 4F - 39 Bedroom 1 (Double)	35.26	14.96
Block A - 4F - 39 Bedroom 2 (Double)	33.65	13.94
Block A - 4F - 39 Ensuite Shower/WC	20.97	17.01

Space Name	Mechanical Extract Boost Rate (l/s)	Mechanical Extract Setback Rate (l/s)
Block A - 4F - 39 Kitchen	34.07	27.39
Block A - 4F - 39 Living/Dining	41.09	32.99
Block A - 4F - 40 Bathroom	20.45	16.59
Block A - 4F - 40 Bedroom 1 (Double)	26.28	12.27
Block A - 4F - 40 Bedroom 2 (Double)	24.96	11.43
Block A - 4F - 40 Bedroom 3 (Double)	24.96	11.43
Block A - 4F - 40 Ensuite Shower/WC	20.45	16.59
Block A - 4F - 40 Kitchen	33.23	26.71
Block A - 4F - 40 Living/Dining	33.7	27.06
Block A - 4F - 40 Utilities	1.88	1.56
Block A - 4F - 41 Ensuite Shower/WC	16.43	13.33
Block A - 4F - 41 Bathroom	16.43	13.33
Block A - 4F - 41 Bedroom 1 (Double)	36.28	12.27
Block A - 4F - 41 Bedroom 2 (Double)	19.96	11.43
Block A - 4F - 41 Bedroom 3 (Double)	19.96	11.43
Block A - 4F - 41 Ensuite Shower/WC	16.43	13.33
Block A - 4F - 41 Kitchen	26.7	21.46
Block A - 4F - 41 Living/Dining	33.7	27.06
Block B - OF - 42 Bathroom	20.97	17.01
Block B - OF - 42 Bedroom 1 (Double)	18.26	14.96
Block B - OF - 42 Bedroom 2 (Double)	16.65	13.94
Block B - OF - 42 Ensuite Shower/WC	20.97	17.01
Block B - OF - 42 Kitchen	34.07	27.39
Block B - OF - 42 Living/Dining	41.09	32.99
Block B - OF - 43 Bathroom	28.95	23.49
Block B - OF - 43 Bedroom 1 (Double)	18.26	14.96
Block B - OF - 43 Bedroom 2 (Single)	16.65	13.94
Block B - OF - 43 Kitchen	47.05	37.82
Block B - OF - 43 Living/Dining	41.09	32.99
Block B - OF - 44 Bathroom	28.95	23.49
Block B - OF - 44 Bedroom 1 (Double)	23.38	19.16
Block B - OF - 44 Kitchen	47.05	37.82
Block B - OF - 44 Living/Dining	52.62	42.25
Block B - OF - 45 Bathroom	28.95	23.49
Block B - OF - 45 Bedroom 1 (Double)	23.38	19.16

Space Name	Mechanical Extract Boost Rate (l/s)	Mechanical Extract Setback Rate (l/s)
Block B - OF - 45 Kitchen	47.05	37.82
Block B - OF - 45 Living/Dining	52.62	42.25
Block B - 1F - 46 Bathroom	28.95	23.49
Block B - 1F - 46 Bedroom 1 (Double)	18.26	14.96
Block B - 1F - 46 Bedroom 2 (Single)	16.65	13.94
Block B - 1F - 46 Kitchen	47.05	37.82
Block B - 1F - 46 Living/Dining	41.09	32.99
Block B - 1F - 47 Bathroom	28.95	23.49
Block B - 1F - 47 Bedroom 1 (Double)	35.26	14.96
Block B - 1F - 47 Bedroom 2 (Single)	27.95	13.94
Block B - 1F - 47 Kitchen	47.05	37.82
Block B - 1F - 47 Living/Dining	41.09	32.99
Block B - 1F - 48 Bathroom	20.97	17.01
Block B - 1F - 48 Bedroom 1 (Double)	35.26	14.96
Block B - 1F - 48 Bedroom 2 (Double)	33.65	13.94
Block B - 1F - 48 Ensuite Shower/WC	20.97	17.01
Block B - 1F - 48 Kitchen	34.07	27.39
Block B - 1F - 48 Living/Dining	41.09	32.99
Block B - 1F - 49 Bathroom	28.95	23.49
Block B - 1F - 49 Bedroom 1 (Double)	23.38	19.16
Block B - 1F - 49 Kitchen	47.05	37.82
Block B - 1F - 49 Living/Dining	52.62	42.25
Block B - 1F - 50 Bathroom	28.95	23.49
Block B - 1F - 50 Bedroom 1 (Double)	18.26	14.96
Block B - 1F - 50 Bedroom 2 (Double)	16.65	13.94
Block B - 1F - 50 Kitchen	47.05	37.82
Block B - 1F - 50 Living/Dining	41.09	32.99
Block B - 2F - 51 Bathroom	28.95	23.49
Block B - 2F - 51 Bedroom 1 (Double)	35.26	14.96
Block B - 2F - 51 Bedroom 2 (Single)	33.65	13.94
Block B - 2F - 51 Kitchen	47.05	37.82
Block B - 2F - 51 Living/Dining	41.09	32.99
Block B - 2F - 52 Bathroom	28.95	23.49
Block B - 2F - 52 Bedroom 1 (Double)	32.26	14.96
Block B - 2F - 52 Bedroom 2 (Single)	33.65	13.94

Space Name	Mechanical Extract Boost Rate (I/S)	Mechanical Extract Setback Rate (I/S)
Block B - 2F - 52 Kitchen	47.05	37.82
Block B - 2F - 52 Living/Dining	41.09	32.99
Block B - 2F - 53 Bathroom	20.97	17.01
Block B - 2F - 53 Bedroom 1 (Double)	32.26	14.96
Block B - 2F - 53 Bedroom 2 (Double)	33.65	13.94
Block B - 2F - 53 Ensuite Shower/WC	20.97	17.01
Block B - 2F - 53 Kitchen	34.07	27.39
Block B - 2F - 53 Living/Dining	41.09	32.99
Block B - 2F - 54 Bathroom	28.95	23.49
Block B - 2F - 54 Bedroom 1 (Double)	23.38	19.16
Block B - 2F - 54 Kitchen	47.05	37.82
Block B - 2F - 54 Living/Dining	41.09	42.25
Block B - 2F - 55 Bathroom	28.95	23.49
Block B - 2F - 55 Bedroom 1 (Double)	35.26	14.96
Block B - 2F - 55 Bedroom 2 (Double)	33.65	13.94
Block B - 2F - 55 Kitchen	47.05	37.82
Block B - 2F - 55 Living/Dining	41.09	32.99
MT1 58 - OF - Bedroom 5 (Double)	14.38	6.34
MT1 58 - OF - Kitchen	26.18	21.05
MT1 58 - OF - Living/Dining	18.69	15.01
MT1 58 - OF - Utilities	1.48	1.23
MT1 58 - OF - WC	16.11	13.07
MT1 58 - 1F - Bedroom 4 (Double)	14.38	6.34
MT1 58 - 1F - Ensuite Shower/WC	16.11	13.07
MT1 58 - 1F - Living	18.69	15.01
MT1 58 - 2F - Bathroom	16.11	13.07
MT1 58 - 2F - Bedroom 1 (Double)	15.11	6.81
MT1 58 - 2F - Bedroom 2 (Double)	14.38	6.34
MT1 58 - 2F - Bedroom 3 (Double)	14.38	6.34
MT1 59 - OF - Bedroom 5 (Double)	10	6.34
MT1 59 - OF - Kitchen	26.18	21.05
MT1 59 - OF - Living/Dining	18.69	15.01
MT1 59 - OF - Utilities	1.48	1.23
MT1 59 - OF - WC	16.11	13.07
MT1 59 - 1F - Bedroom 4 (Double)	32.62	6.34

Space Name	Mechanical Extract Boost Rate (l/s)	Mechanical Extract Setback Rate (l/s)
MT1 59 - 1F - Ensuite Shower/WC	16.11	13.07
MT1 59 - 1F - Living	18.69	15.01
MT1 59 - 2F - Bathroom	16.11	13.07
MT1 59 - 2F - Bedroom 1 (Double)	10	6.81
MT1 59 - 2F - Bedroom 2 (Double)	10	6.34
MT1 59 - 2F - Bedroom 3 (Double)	10	6.34
MT1 60 - OF - Bedroom 5 (Double)	7.58	6.34
MT1 60 - OF - Kitchen	26.18	21.05
MT1 60 - OF - Living/Dining	18.69	15.01
MT1 60 - OF - Utilities	1.48	1.23
MT1 60 - OF - WC	16.11	13.07
MT1 60 - 1F - Bedroom 4 (Double)	41.58	6.34
MT1 60 - 1F - Ensuite Shower/WC	16.11	13.07
MT1 60 - 1F - Living	18.69	15.01
MT1 60 - 2F - Bathroom	16.11	13.07
MT1 60 - 2F - Bedroom 1 (Double)	8.31	6.81
MT1 60 - 2F - Bedroom 2 (Double)	7.58	6.34
MT1 60 - 2F - Bedroom 3 (Double)	7.58	6.34
MT1 61 - OF - Bedroom 5 (Double)	7.58	6.34
MT1 61 - OF - Kitchen	16.18	21.5
MT1 61 - OF - Living/Dining	13.69	15.01
MT1 61 - OF - Utilities	1.48	1.23
MT1 61 - OF - WC	16.11	13.07
MT1 61 - 1F - Bedroom 4 (Double)	41.58	6.34
MT1 61 - 1F - Ensuite Shower/WC	16.11	13.07
MT1 61 - 1F - Living	13.69	15.01
MT1 61 - 2F - Bathroom	16.11	13.07
MT1 61 - 2F - Bedroom 1 (Double)	8.31	6.81
MT1 61 - 2F - Bedroom 2 (Double)	17.58	6.34
MT1 61 - 2F - Bedroom 3 (Double)	7.58	6.34
MT1 62 - OF - Bedroom 4 (Double)	8.41	7.04
MT1 62 - OF - Kitchen	21.6	17.37
MT1 62 - OF - Living/Dining	15.76	16.67
MT1 62 - OF - Utilities	1.22	1.01
MT1 62 - OF - WC	13.29	10.78

Space Name	Mechanical Extract Boost Rate (l/s)	Mechanical Extract Setback Rate (l/s)
MT1 62 - 1F - Bathroom	13.29	10.78
MT1 62 - 1F - Bedroom 3 (Double)	36.41	7.04
MT1 62 - 1F - Living	15.76	16.67
MT1 62 - 2F - Bathroom	13.29	10.78
MT1 62 - 2F - Bedroom 2 (Double)	14.41	7.04
MT1 62 - 2F - Ensuite Shower/WC	13.29	10.78
MT1 62 - 2F - Principle Bedroom (Double)	9.23	7.56
MT2 56 - OF - Kitchen	26.7	21.46
MT2 56 - OF - Living	20.76	16.67
MT2 56 - OF - Living/Dining	20.76	16.67
MT2 56 - OF - WC	16.43	13.33
MT2 56 - 1F - Bathroom	16.43	13.33
MT2 56 - 1F - Bedroom 2 (Double)	8.41	7.04
MT2 56 - 1F - Bedroom 3 (Double)	8.41	7.04
MT2 56 - 1F - Bedroom 4 (Single)	8.41	7.04
MT2 56 - 2F - Bedroom 1 (Double)	8.23	7.56
MT2 56 - 2F - Ensuite Shower/WC	16.43	13.33
MT2 57 - OF - Kitchen	26.7	21.46
MT2 57 - OF - Living	20.76	32.99
MT2 57 - OF - Living/Dining	20.76	32.99
MT2 57 - OF - WC	16.43	13.33
MT2 57 - 1F - Bathroom	16.43	13.33
MT2 57 - 1F - Bedroom 2 (Double)	8.41	13.94
MT2 57 - 1F - Bedroom 3 (Double)	8.41	13.94
MT2 57 - 1F - Bedroom 4 (Single)	8.41	13.94
MT2 57 - 2F - Bedroom 1 (Double)	9.23	14.96
MT2 57 - 2F - Ensuite Shower/WC	16.43	13.33

Table 2 Mechanical Ventilation Boost and Setback Rates

**Air tempering is modelled for all spaces that are mechanically ventilated. This is assumed to have a supply air temperature of 10°C below the external temperature.**

### 3.2.4 Infiltration Rate

Based on the proposed target air leakage and the guidance in CIBSE Guide A Table 4.24, an average infiltration rate of 0.25 air changes per hour has been applied throughout the modelled areas.

### 3.3 BASIC BUILDING FABRIC DETAILS

Correspondence with the design team confirmed the following design intent relating to the buildings' fabric thermal performance. A breakdown of the building fabric build ups and the thermal performance of each element are provided in Table 3 below. The notes in red are assumptions that need to be reviewed by the design team.

Model Element	Input Used
<b>Opaque Building Fabric Details - External Walls</b>	
MT1 - Metal Cladding/Blockwork External Wall - U 0.13 - U Value (W/m2.K)	0.16
MT1 - Metal Cladding/Blockwork External Wall - U 0.13 - Fabric	Rainscreen 20.0mm, Cavity 50.0mm, Concrete Block 100.0mm, Cavity 50.0mm, Insulation 100.0mm, Concrete Block 100.0mm, Plasterboard 12.5mm
MT1 - Stone/Brick External Wall - U 0.13 - U Value (W/m2.K)	0.16
MT1 - Stone/Brick External Wall - U 0.13 - Fabric	Concrete Block 100.0mm, Cavity 50.0mm, Insulation 100.0mm, Concrete Block 100.0mm, Plasterboard 12.5mm
Block A - Stone/Brick External Wall - U 0.16 - U Value (W/m2.K)	0.16
Block A - Stone/Brick External Wall - U 0.16 - Fabric	Brickwork (Outer Leaf) 102.5mm, Cavity 50.0mm, Insulation 150.0mm, Cavity 150.0mm, Plasterboard 12.5mm
Block B - Stone/Brick External Wall - U 0.16 - U Value (W/m2.K)	0.16
Block B - Stone/Brick External Wall - U 0.16 - Fabric	Brickwork (Outer Leaf) 100.0mm, Cavity 50.0mm, Insulation 100.0mm, Concrete Block 100.0mm, Cavity 50.0mm, Plasterboard 12.5mm
Block B - Rainscreen Cladding External Wall - U 0.16 - U Value (W/m2.K)	0.16
Block B - Rainscreen Cladding External Wall - U 0.16 - Fabric	Rainscreen 20.0mm, Cavity 50.0mm, Insulation 100.0mm, Cavity 50.0mm, Insulation 100.0mm, Plasterboard 12.5mm
MT2 - Metal Cladding/Blockwork External Wall - U 0.13 - U Value (W/m2.K)	0.16
MT2 - Metal Cladding/Blockwork External Wall - U 0.13 - Fabric	Rainscreen 20.0mm, Cavity 50.0mm, Concrete Block 100.0mm, Cavity 50.0mm, Insulation 100.0mm, Concrete Block 100.0mm, Plasterboard 12.5mm
MT2 - Stone/Brick External Wall - U 0.13 - U Value (W/m2.K)	0.16
MT2 - Stone/Brick External Wall - U 0.13 - Fabric	Concrete Block 100.0mm, Cavity 50.0mm, Insulation 100.0mm, Concrete Block 100.0mm, Plasterboard 12.5mm
<b>Opaque Building Fabric Details - Ground/Exposed Floors</b>	
Block B - Ground Floor - U 0.11 - U Value (W/m2.K)	0.11
Block B - Ground Floor - U 0.11 -	Reinforced Concrete 80.0mm, Insulation 80.0mm, Screed



Model Element	Input Used
Fabric	60.0mm
MT2 - Ground Floor - U 0.11 - U Value (W/m2.K)	0.11
MT2 - Ground Floor - U 0.11 - Fabric	Reinforced Concrete 50.0mm, Cavity 100.0mm, Insulation 140.0mm, Screed 60.0mm
MT1 - Ground Floor - U 0.11 - U Value (W/m2.K)	0.11
MT1 - Ground Floor - U 0.11 - Fabric	Reinforced Concrete 50.0mm, Cavity 100.0mm, Insulation 140.0mm, Screed 60.0mm
Block A - Ground Floor - U 0.11 - U Value (W/m2.K)	0.11
Block A - Ground Floor - U 0.11 - Fabric	Reinforced Concrete 200.0mm, Insulation 150.0mm, Screed 70.0mm
<b>Opaque Building Fabric Details - Roofs</b>	
Block B - Overhang Roof - 0.11 - U Value (W/m2.K)	0.11
Block B - Overhang Roof - 0.11 - Fabric	Screed 70.0mm, Insulation 30.0mm, Reinforced Concrete 200.0mm, Cavity 50.0mm, Plasterboard 12.5mm
Block B - Flat & Pitched Metal Cladding Roof - U 0.11 - U Value (W/m2.K)	0.11
Block B - Flat & Pitched Metal Cladding Roof - U 0.11 - Fabric	Rainscreen 20.0mm, Cavity 40.0mm, Insulation 100.0mm, Cavity 80.0mm, Plasterboard 12.5mm
Block A - Flat & Pitched Metal Cladding Roof - U 0.11 - U Value (W/m2.K)	0.11
Block A - Flat & Pitched Metal Cladding Roof - U 0.11 - Fabric	Rainscreen 20.0mm, Cavity 40.0mm, Insulation 100.0mm, Cavity 80.0mm, Plasterboard 12.5mm
MT2 - Pitched Metal Roof Cladding - U 0.11 - U Value (W/m2.K)	0.11
MT2 - Pitched Metal Roof Cladding - U 0.11 - Fabric	Rainscreen 20.0mm, Cavity 150.0mm, Membrane 1.0mm, Cavity 50.0mm, Insulation 100.0mm, Cavity 10.0mm, Insulation 100.0mm, Cavity 80.0mm, Insulation 30.0mm, Plasterboard 12.5mm
MT1 - Pitched Metal Roof Cladding - U 0.11 - U Value (W/m2.K)	0.11
MT1 - Pitched Metal Roof Cladding - U 0.11 - Fabric	Rainscreen 20.0mm, Cavity 150.0mm, Membrane 1.0mm, Cavity 50.0mm, Insulation 100.0mm, Cavity 10.0mm, Insulation 100.0mm, WOOD BLOCKS 200.0mm, Insulation 30.0mm, Plasterboard 12.5mm
<b>Opaque Building Fabric Details - Exterior Doors/Opaque Panels</b>	
Block B - Solid Door - U 1.0 - U Value (W/m2.K)	1.0
Block B - Solid Door - U 1.0 -	Plywood- 30 mm 37.0mm

Model Element	Input Used
Fabric	
MT2 - Solid Door - U 1.0 - U Value (W/m2.K)	1.0
MT2 - Solid Door - U 1.0 - Fabric	Plywood- 30 mm 37.0mm
Block B - Louvred Wall - U 0.18 - U Value (W/m2.K)	0.18
Block B - Louvred Wall - U 0.18 - Fabric	STEEL 30.0mm
MT1 - Solid Door - U 1.0 - U Value (W/m2.K)	1.0
MT1 - Solid Door - U 1.0 - Fabric	Plywood- 30 mm 37.0mm
Block A - Louvred Door - U 1.0 - U Value (W/m2.K)	1.0
Block A - Louvred Door - U 1.0 - Fabric	STEEL 30.0mm
Block A - Solid Door - U 1.0 - U Value (W/m2.K)	1.0
Block A - Solid Door - U 1.0 - Fabric	Plywood- 30 mm 37.0mm
2013 Door - U Value (W/m2.K)	2.2
2013 Door - Fabric	Plywood- 30 mm 37.0mm
MT2 - Metal Cladding/Blockwork External Wall - U 0.16 - U Value (W/m2.K)	0.16
MT2 - Metal Cladding/Blockwork External Wall - U 0.16 - Fabric	Rainscreen 20.0mm, Cavity 50.0mm, Concrete Block 100.0mm, Cavity 50.0mm, Insulation 100.0mm, Concrete Block 100.0mm, Plasterboard 12.5mm
<b>Opaque Building Fabric Details - Internal Walls</b>	
2013 Internal Partition - U Value (W/m <sup>2</sup> .K)	1.79
2013 Internal Partition - Fabric	Plasterboard 12.5mm, Cavity 50.0mm, Plasterboard 12.5mm
Party Wall to Unheated - 0.16 - U Value (W/m2.K)	0.16
Party Wall to Unheated - 0.16 - Fabric	Plasterboard 12.5mm, Insulation 100.0mm, Concrete Block 50.0mm, Cavity 50.0mm, Insulation 100.0mm, Plasterboard 12.5mm
<b>Opaque Building Fabric Details - Internal Floors/Ceilings</b>	
Block B - Internal Floor - U Value (W/m2.K)	0.69
Block B - Internal Floor - Fabric	Screed 70.0mm, Insulation 30.0mm, Reinforced Concrete 200.0mm
Block B - Ceiling Tiles - U Value (W/m2.K)	1.79

Model Element	Input Used
Block B - Ceiling Tiles - Fabric	CEILING TILES 20.0mm
MT2 - Internal Floor - U Value (W/m <sup>2</sup> .K)	0.69
MT2 - Internal Floor - Fabric	Screed 70.0mm, Insulation 30.0mm, Reinforced Concrete 200.0mm
MT1 - Ceiling Tiles - U Value (W/m <sup>2</sup> .K)	1.79
MT1 - Ceiling Tiles - Fabric	CEILING TILES 20.0mm
Block A - Internal Floor - U Value (W/m <sup>2</sup> .K)	0.69
Block A - Internal Floor - Fabric	Screed 70.0mm, Insulation 30.0mm, Reinforced Concrete 200.0mm
<b>Transparent Building Fabric Elements - External Glazing</b>	
U Value (W/m <sup>2</sup> .K) (including frame)	1
Frame Percentage (%)	Varies
G Value (SHGC)	0.4
Light Transmittance Factor	0.69
<b>Transparent Building Fabric Elements - Skylights</b>	
U Value (W/m <sup>2</sup> .K) (including frame)	1
Frame Percentage (%)	Varies
G Value (SHGC)	0.4
Light Transmittance Factor	0.69
<b>Other Fabric Details</b>	
Air Permeability (m <sup>3</sup> /h/m <sup>2</sup> @50Pa)	3
Infiltration Method	CIBSE TM23

Table 3: Construction build ups and thermal performances of building fabric

## 4. RESULTS

### 4.1 TM59 COMPLIANCE

The below results are based on the spaces being assessed as predominantly naturally ventilated.

#### 4.1.1 Results – DSY1 2020 Weather Data

In line with the Bristol Council guidance, the model has been assessed using the 2020 weather year. The results are reported in Table 4.

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - OF - 1 Bedroom 1 (Double)	0	0.4	PASS
Block A - OF - 1 Bedroom 2 (Double)	0	0.3	PASS
Block A - OF - 1 Kitchen	0.1	N/A	PASS
Block A - OF - 1 Living/Dining	0.4	N/A	PASS
Block A - OF - 2 Bedroom 2 (Double)	0	0	PASS
Block A - OF - 2 Bedroom 1 (Double)	0	0	PASS
Block A - OF - 2 Kitchen	0	N/A	PASS
Block A - OF - 2 Living/Dining	0	N/A	PASS
Block A - OF - 3 Bedroom 1 (Double)	0	0	PASS
Block A - OF - 3 Bedroom 2 (Double)	0	0	PASS
Block A - OF - 3 Kitchen	0	N/A	PASS
Block A - OF - 3 Living/Dining	0	N/A	PASS
Block A - OF - 4 Bedroom 1 (Double)	0	0	PASS
Block A - OF - 4 Bedroom 2 (Double)	0	0	PASS
Block A - OF - 4 Kitchen	0	N/A	PASS
Block A - OF - 4 Living/Dining	0	N/A	PASS
Block A - OF - 5 Bedroom 1 (Double)	0.1	0.2	PASS
Block A - OF - 5 Bedroom 2 (Double)	0	0	PASS
Block A - OF - 5 Kitchen	0	N/A	PASS
Block A - OF - 5 Living/Dining	0	N/A	PASS
Block A - OF - 6 Bedroom 1 (Double)	0	0	PASS
Block A - OF - 6 Bedroom 2 (Double)	0	0	PASS
Block A - OF - 6 Kitchen	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - OF - 6 Living/Dining	0	N/A	PASS
Block A - OF - 7 Bedroom 1 (Double)	0	0.4	PASS
Block A - OF - 7 Bedroom 2 (Double)	0	0.3	PASS
Block A - OF - 7 Kitchen	0.9	N/A	PASS
Block A - OF - 7 Living/Dining	1.2	N/A	PASS
Block A - OF - 8 Bedroom 1 (Double)	0	0	PASS
Block A - OF - 8 Bedroom 2 (Double)	0	0	PASS
Block A - OF - 8 Kitchen	0.2	N/A	PASS
Block A - OF - 8 Living/Dining	0.2	N/A	PASS
Block A - IF - 9 Bedroom 1 (Double)	0	0	PASS
Block A - IF - 9 Bedroom 2 (Double)	0.6	0.1	PASS
Block A - IF - 9 Kitchen	0	N/A	PASS
Block A - IF - 9 Living/Dining	0	N/A	PASS
Block A - IF - 10 Bedroom 1 (Double)	0	0	PASS
Block A - IF - 10 Bedroom 2 (Double)	0.3	0	PASS
Block A - IF - 10 Kitchen	0	N/A	PASS
Block A - IF - 10 Living/Dining	0	N/A	PASS
Block A - IF - 11 Bedroom 1 (Double)	0	0	PASS
Block A - IF - 11 Kitchen	0	N/A	PASS
Block A - IF - 11 Living/Dining	0	N/A	PASS
Block A - IF - 12 Bedroom 1 (Double)	0	0	PASS
Block A - IF - 12 Kitchen	0	N/A	PASS
Block A - IF - 12 Living/Dining	0	N/A	PASS
Block A - IF - 13 Bedroom 1 (Double)	0	0	PASS
Block A - IF - 13 Bedroom 2 (Double)	0	0	PASS
Block A - IF - 13 Kitchen	0	N/A	PASS
Block A - IF - 13 Living/Dining	0	N/A	PASS
Block A - IF - 14 Bedroom 1 (Double)	0	0	PASS
Block A - IF - 14 Bedroom 2 (Double)	0	0	PASS
Block A - IF - 14 Kitchen	0	N/A	PASS
Block A - IF - 14 Living/Dining	0	N/A	PASS
Block A - IF - 15 Bedroom 1 (Double)	0	0	PASS
Block A - IF - 15 Bedroom 2 (Double)	0.4	0	PASS
Block A - IF - 15 Kitchen	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 1F - 15 Living/Dining	0	N/A	PASS
Block A - 1F - 16 Bedroom1 (Double)	0	0	PASS
Block A - 1F - 16 Kitchen	0	N/A	PASS
Block A - 1F - 16 Living/Dining	0	N/A	PASS
Block A - 1F - 17 Bedroom 1 (Double)	0	0	PASS
Block A - 1F - 17 Bedroom 2 (Double)	0.5	0	PASS
Block A - 1F - 17 Kitchen	0.6	N/A	PASS
Block A - 1F - 17 Living/Dining	0.3	N/A	PASS
Block A - 1F - 18 Bedroom 1 (Double)	0	0	PASS
Block A - 1F - 18 Kitchen	0	N/A	PASS
Block A - 1F - 18 Living/Dining	0	N/A	PASS
Block A - 2F - 19 Bedroom 1 (Double)	0.7	0.6	PASS
Block A - 2F - 19 Bedroom 2 (Double)	0.3	0.1	PASS
Block A - 2F - 19 Kitchen	0	N/A	PASS
Block A - 2F - 19 Living/Dining	0	N/A	PASS
Block A - 2F - 20 Bedroom 1 (Double)	0	0	PASS
Block A - 2F - 20 Bedroom 2 (Double)	0	0	PASS
Block A - 2F - 20 Kitchen	0	N/A	PASS
Block A - 2F - 20 Living/Dining	0	N/A	PASS
Block A - 2F - 21 Bedroom 1 (Double)	0.2	0.8	PASS
Block A - 2F - 21 Bedroom 2 (Double)	0.8	1.6	PASS
Block A - 2F - 21 Kitchen	0	N/A	PASS
Block A - 2F - 21 Living/Dining	0	N/A	PASS
Block A - 2F - 22 Bedroom 1 (Double)	0	0	PASS
Block A - 2F - 22 Kitchen	0	N/A	PASS
Block A - 2F - 22 Living/Dining	0	N/A	PASS
Block A - 2F - 23 Bedroom 1 (Double)	0	0	PASS
Block A - 2F - 23 Bedroom 2 (Double)	0	0	PASS
Block A - 2F - 23 Kitchen	0	N/A	PASS
Block A - 2F - 23 Living/Dining	0	N/A	PASS
Block A - 2F - 24 Bedroom 1 (Double)	0	0	PASS
Block A - 2F - 24 Bedroom 2 (Double)	0	0.3	PASS
Block A - 2F - 24 Kitchen	0	N/A	PASS
Block A - 2F - 24 Living/Dining	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 2F - 25 Bedroom 1 (Double)	0.3	0.9	PASS
Block A - 2F - 25 Bedroom 2 (Double)	1.1	1.4	PASS
Block A - 2F - 25 Kitchen	0	N/A	PASS
Block A - 2F - 25 Living/Dining	0	N/A	PASS
Block A - 2F - 26 Bedroom 1 (Double)	0	0	PASS
Block A - 2F - 26 Kitchen	0	N/A	PASS
Block A - 2F - 26 Living/Dining	0	N/A	PASS
Block A - 2F - 27 Bedroom 1 (Double)	0	0	PASS
Block A - 2F - 27 Bedroom 2 (Double)	0	0.1	PASS
Block A - 2F - 27 Kitchen	0	N/A	PASS
Block A - 2F - 27 Living/Dining	0	N/A	PASS
Block A - 2F - 28 Bedroom 1 (Double)	1.2	0.7	PASS
Block A - 2F - 28 Bedroom 2 (Double)	0.2	0	PASS
Block A - 2F - 28 Kitchen	0	N/A	PASS
Block A - 2F - 28 Living/Dining	0	N/A	PASS
Block A - 3F - 29 Bedroom 1 (Double)	1.4	1.1	PASS
Block A - 3F - 29 Bedroom 2 (Double)	0.3	0	PASS
Block A - 3F - 29 Kitchen	0	N/A	PASS
Block A - 3F - 29 Living/Dining	0.1	N/A	PASS
Block A - 3F - 30 Bedroom 1 (Double)	0	0	PASS
Block A - 3F - 30 Bedroom 2 (Double)	0	0	PASS
Block A - 3F - 30 Kitchen	0	N/A	PASS
Block A - 3F - 30 Living/Dining	0	N/A	PASS
Block A - 3F - 31 Bedroom 1 (Double)	0.2	0	PASS
Block A - 3F - 31 Bedroom 2 (Double)	1.6	1	PASS
Block A - 3F - 31 Kitchen	0	N/A	PASS
Block A - 3F - 31 Living/Dining	0.1	N/A	PASS
Block A - 3F - 32 Bedroom 1 (Double)	0	0	PASS
Block A - 3F - 32 Kitchen	0	N/A	PASS
Block A - 3F - 32 Living/Dining	0	N/A	PASS
Block A - 3F - 33 Bedroom 1 (Double)	0	0	PASS
Block A - 3F - 33 Bedroom 2 (Double)	0.1	0.4	PASS
Block A - 3F - 33 Bedroom 3 (Double)	0.1	0.3	PASS
Block A - 3F - 33 Kitchen	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 3F - 33 Living/Dining	0.4	N/A	PASS
Block A - 3F - 34 Bedroom 1 (Double)	0	0	PASS
Block A - 3F - 34 Bedroom 2 (Double)	0.2	0.6	PASS
Block A - 3F - 34 Bedroom 3 (Double)	0.2	0.3	PASS
Block A - 3F - 34 Kitchen	0	N/A	PASS
Block A - 3F - 34 Living/Dining	0.4	N/A	PASS
Block A - 3F - 35 Bedroom 1 (Double)	0.2	0	PASS
Block A - 3F - 35 Bedroom 2 (Double)	1	0	PASS
Block A - 3F - 35 Kitchen	0.1	N/A	PASS
Block A - 3F - 35 Living/Dining	0.5	N/A	PASS
Block A - 3F - 36 Bedroom 1 (Double)	0	0	PASS
Block A - 3F - 36 Kitchen	0	N/A	PASS
Block A - 3F - 36 Living/Dining	0	N/A	PASS
Block A - 3F - 37 Bedroom 1 (Double)	0	0.4	PASS
Block A - 3F - 37 Bedroom 2 (Double)	0	2	PASS
Block A - 3F - 37 Kitchen	0	N/A	PASS
Block A - 3F - 37 Living/Dining	0	N/A	PASS
Block A - 4F - 38 Bedroom 1 (Double)	0	1	PASS
Block A - 4F - 38 Bedroom 2 (Double)	0	0.6	PASS
Block A - 4F - 38 Bedroom 3 (Single)	0	0.1	PASS
Block A - 4F - 38 Kitchen	0.2	N/A	PASS
Block A - 4F - 38 Living/Dining	0.4	N/A	PASS
Block A - 4F - 39 Bedroom 1 (Double)	0.5	1	PASS
Block A - 4F - 39 Bedroom 2 (Double)	0	0.7	PASS
Block A - 4F - 39 Kitchen	0.2	N/A	PASS
Block A - 4F - 39 Living/Dining	0.2	N/A	PASS
Block A - 4F - 40 Bedroom 1 (Double)	0	1	PASS
Block A - 4F - 40 Bedroom 2 (Double)	0	0.6	PASS
Block A - 4F - 40 Bedroom 3 (Double)	0	0.7	PASS
Block A - 4F - 40 Kitchen	0.5	N/A	PASS
Block A - 4F - 40 Living/Dining	0.5	N/A	PASS
Block A - 4F - 41 Bedroom 1 (Double)	0.2	1.4	PASS
Block A - 4F - 41 Bedroom 2 (Double)	0	1.7	PASS
Block A - 4F - 41 Bedroom 3 (Double)	0	2.3	PASS



	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 4F - 41 Kitchen	0.3	N/A	PASS
Block A - 4F - 41 Living/Dining	0.3	N/A	PASS
Block B - OF - 42 Bedroom 1 (Double)	0	0	PASS
Block B - OF - 42 Bedroom 2 (Double)	0	0	PASS
Block B - OF - 42 Kitchen	0	N/A	PASS
Block B - OF - 42 Living/Dining	0	N/A	PASS
Block B - OF - 43 Bedroom 1 (Double)	0	0	PASS
Block B - OF - 43 Bedroom 2 (Single)	0	0	PASS
Block B - OF - 43 Kitchen	0	N/A	PASS
Block B - OF - 43 Living/Dining	0	N/A	PASS
Block B - OF - 44 Bedroom 1 (Double)	0	0	PASS
Block B - OF - 44 Kitchen	0	N/A	PASS
Block B - OF - 44 Living/Dining	0	N/A	PASS
Block B - OF - 45 Bedroom 1 (Double)	0	0	PASS
Block B - OF - 45 Kitchen	0	N/A	PASS
Block B - OF - 45 Living/Dining	0	N/A	PASS
Block B - 1F - 46 Bedroom 1 (Double)	0	0	PASS
Block B - 1F - 46 Bedroom 2 (Single)	0	0	PASS
Block B - 1F - 46 Kitchen	0	N/A	PASS
Block B - 1F - 46 Living/Dining	0	N/A	PASS
Block B - 1F - 47 Bedroom 1 (Double)	0	0	PASS
Block B - 1F - 47 Bedroom 2 (Single)	0	0	PASS
Block B - 1F - 47 Kitchen	0	N/A	PASS
Block B - 1F - 47 Living/Dining	0	N/A	PASS
Block B - 1F - 48 Bedroom 1 (Double)	0	0	PASS
Block B - 1F - 48 Bedroom 2 (Double)	0	0	PASS
Block B - 1F - 48 Kitchen	0	N/A	PASS
Block B - 1F - 48 Living/Dining	0	N/A	PASS
Block B - 1F - 49 Bedroom 1 (Double)	0	0	PASS
Block B - 1F - 49 Kitchen	0	N/A	PASS
Block B - 1F - 49 Living/Dining	0	N/A	PASS
Block B - 1F - 50 Bedroom 1 (Double)	0	0	PASS
Block B - 1F - 50 Bedroom 2 (Double)	0	0	PASS
Block B - 1F - 50 Kitchen	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block B - 1F - 50 Living/Dining	0	N/A	PASS
Block B - 2F - 51 Bedroom 1 (Double)	0	0	PASS
Block B - 2F - 51 Bedroom 2 (Single)	0	0	PASS
Block B - 2F - 51 Kitchen	0	N/A	PASS
Block B - 2F - 51 Living/Dining	0	N/A	PASS
Block B - 2F - 52 Bedroom 1 (Double)	0	0	PASS
Block B - 2F - 52 Bedroom 2 (Single)	0	0	PASS
Block B - 2F - 52 Kitchen	0	N/A	PASS
Block B - 2F - 52 Living/Dining	0	N/A	PASS
Block B - 2F - 53 Bedroom 1 (Double)	0	0	PASS
Block B - 2F - 53 Bedroom 2 (Double)	0	0	PASS
Block B - 2F - 53 Kitchen	0	N/A	PASS
Block B - 2F - 53 Living/Dining	0	N/A	PASS
Block B - 2F - 54 Bedroom 1 (Double)	0	0	PASS
Block B - 2F - 54 Kitchen	0	N/A	PASS
Block B - 2F - 54 Living/Dining	0	N/A	PASS
Block B - 2F - 55 Bedroom 1 (Double)	0	0	PASS
Block B - 2F - 55 Bedroom 2 (Double)	0	0	PASS
Block B - 2F - 55 Kitchen	0	N/A	PASS
Block B - 2F - 55 Living/Dining	0	N/A	PASS
MT1 58 - OF - Bedroom 5 (Double)	0	0	PASS
MT1 58 - OF - Kitchen	0.1	N/A	PASS
MT1 58 - OF - Living/Dining	0.2	N/A	PASS
MT1 58 - 1F - Bedroom 4 (Double)	0	0	PASS
MT1 58 - 1F - Living	0	N/A	PASS
MT1 58 - 2F - Bedroom 1 (Double)	0	1.1	PASS
MT1 58 - 2F - Bedroom 2 (Double)	0	1.1	PASS
MT1 58 - 2F - Bedroom 3 (Double)	0	0.8	PASS
MT1 59 - OF - Bedroom 5 (Double)	0	0	PASS
MT1 59 - OF - Kitchen	0.2	N/A	PASS
MT1 59 - OF - Living/Dining	0.5	N/A	PASS
MT1 59 - 1F - Bedroom 4 (Double)	0	0	PASS
MT1 59 - 1F - Living	0	N/A	PASS
MT1 59 - 2F - Bedroom 1 (Double)	0	2.8	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
MT1 59 - 2F - Bedroom 2 (Double)	0	2.8	PASS
MT1 59 - 2F - Bedroom 3 (Double)	0	2.5	PASS
MT1 60 - OF - Bedroom 5 (Double)	0	0	PASS
MT1 60 - OF - Kitchen	0.2	N/A	PASS
MT1 60 - OF - Living/Dining	0.5	N/A	PASS
MT1 60 - 1F - Bedroom 4 (Double)	0	0	PASS
MT1 60 - 1F - Living	0	N/A	PASS
MT1 60 - 2F - Bedroom 1 (Double)	0	3.4	PASS
MT1 60 - 2F - Bedroom 2 (Double)	0	3.5	PASS
MT1 60 - 2F - Bedroom 3 (Double)	0	3.6	PASS
MT1 61 - OF - Bedroom 5 (Double)	0	0	PASS
MT1 61 - OF - Kitchen	0.3	N/A	PASS
MT1 61 - OF - Living/Dining	0.6	N/A	PASS
MT1 61 - 1F - Bedroom 4 (Double)	0	0	PASS
MT1 61 - 1F - Living	0	N/A	PASS
MT1 61 - 2F - Bedroom 1 (Double)	0	3.1	PASS
MT1 61 - 2F - Bedroom 2 (Double)	0	1	PASS
MT1 61 - 2F - Bedroom 3 (Double)	0	3.6	PASS
MT1 62 - OF - Bedroom 4 (Double)	0	0	PASS
MT1 62 - OF - Kitchen	0.1	N/A	PASS
MT1 62 - OF - Living/Dining	0.3	N/A	PASS
MT1 62 - 1F - Bedroom 3 (Double)	0	0	PASS
MT1 62 - 1F - Living	0	N/A	PASS
MT1 62 - 2F - Bedroom 2 (Double)	0	0.9	PASS
MT1 62 - 2F - Principle Bedroom (Double)	0	1.3	PASS
MT2 56 - OF - Kitchen	0	N/A	PASS
MT2 56 - OF - Living	0	N/A	PASS
MT2 56 - OF - Living/Dining	0.1	N/A	PASS
MT2 56 - 1F - Bedroom 2 (Double)	0	1.3	PASS
MT2 56 - 1F - Bedroom 3 (Double)	0	3.2	PASS
MT2 56 - 1F - Bedroom 4 (Single)	0	1.1	PASS
MT2 56 - 2F - Bedroom 1 (Double)	0	1.9	PASS
MT2 57 - OF - Kitchen	0	N/A	PASS
MT2 57 - OF - Living	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
MT2 57 - OF - Living/Dining	0	N/A	PASS
MT2 57 - 1F - Bedroom 2 (Double)	0	0.2	PASS
MT2 57 - 1F - Bedroom 3 (Double)	0	1.1	PASS
MT2 57 - 1F - Bedroom 4 (Single)	0	0.7	PASS
MT2 57 - 2F - Bedroom 1 (Double)	0	1.2	PASS

Table 4: TM59 Results Using DSY1 2020 Weather Data

#### 4.1.2 Results – DSY1 2050 Weather Data

In line with the Bristol Council guidance, the model has also been assessed using the 2050 weather year. The results are reported in Table 5.

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - OF - 1 Bedroom 1 (Double)	0.2	3.4	PASS
Block A - OF - 1 Bedroom 2 (Double)	0.1	3	PASS
Block A - OF - 1 Kitchen	1.1	N/A	PASS
Block A - OF - 1 Living/Dining	1.5	N/A	PASS
Block A - OF - 2 Bedroom 2 (Double)	0	2.1	PASS
Block A - OF - 2 Bedroom 1 (Double)	0	1.9	PASS
Block A - OF - 2 Kitchen	0.2	N/A	PASS
Block A - OF - 2 Living/Dining	0.1	N/A	PASS
Block A - OF - 3 Bedroom 1 (Double)	0	1.1	PASS
Block A - OF - 3 Bedroom 2 (Double)	0	2.5	PASS
Block A - OF - 3 Kitchen	0	N/A	PASS
Block A - OF - 3 Living/Dining	0	N/A	PASS
Block A - OF - 4 Bedroom 1 (Double)	0.2	2	PASS
Block A - OF - 4 Bedroom 2 (Double)	0	1.1	PASS
Block A - OF - 4 Kitchen	0	N/A	PASS
Block A - OF - 4 Living/Dining	0	N/A	PASS
Block A - OF - 5 Bedroom 1 (Double)	0.4	2.6	PASS
Block A - OF - 5 Bedroom 2 (Double)	0	1.1	PASS
Block A - OF - 5 Kitchen	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - OF - 5 Living/Dining	0.1	N/A	PASS
Block A - OF - 6 Bedroom 1 (Double)	0	1.2	PASS
Block A - OF - 6 Bedroom 2 (Double)	0	2.2	PASS
Block A - OF - 6 Kitchen	0	N/A	PASS
Block A - OF - 6 Living/Dining	0.1	N/A	PASS
Block A - OF - 7 Bedroom 1 (Double)	0.3	3.4	PASS
Block A - OF - 7 Bedroom 2 (Double)	0.1	2.8	PASS
Block A - OF - 7 Kitchen	1.6	N/A	PASS
Block A - OF - 7 Living/Dining	2	N/A	PASS
Block A - OF - 8 Bedroom 1 (Double)	0	2.1	PASS
Block A - OF - 8 Bedroom 2 (Double)	0	1.9	PASS
Block A - OF - 8 Kitchen	0.7	N/A	PASS
Block A - OF - 8 Living/Dining	0.5	N/A	PASS
Block A - 1F - 9 Bedroom 1 (Double)	0	2.2	PASS
Block A - 1F - 9 Bedroom 2 (Double)	1.8	2.4	PASS
Block A - 1F - 9 Kitchen	0.7	N/A	PASS
Block A - 1F - 9 Living/Dining	0.5	N/A	PASS
Block A - 1F - 10 Bedroom 1 (Double)	0.2	1.3	PASS
Block A - 1F - 10 Bedroom 2 (Double)	0.7	1.8	PASS
Block A - 1F - 10 Kitchen	0	N/A	PASS
Block A - 1F - 10 Living/Dining	0.2	N/A	PASS
Block A - 1F - 11 Bedroom 1 (Double)	0	1.1	PASS
Block A - 1F - 11 Kitchen	0	N/A	PASS
Block A - 1F - 11 Living/Dining	0	N/A	PASS
Block A - 1F - 12 Bedroom 1 (Double)	0.1	1.5	PASS
Block A - 1F - 12 Kitchen	0	N/A	PASS
Block A - 1F - 12 Living/Dining	0	N/A	PASS
Block A - 1F - 13 Bedroom 1 (Double)	0	1.2	PASS
Block A - 1F - 13 Bedroom 2 (Double)	0	2.3	PASS
Block A - 1F - 13 Kitchen	0	N/A	PASS
Block A - 1F - 13 Living/Dining	0.1	N/A	PASS
Block A - 1F - 14 Bedroom 1 (Double)	0	1.2	PASS
Block A - 1F - 14 Bedroom 2 (Double)	0.1	2.9	PASS
Block A - 1F - 14 Kitchen	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 1F - 14 Living/Dining	0.1	N/A	PASS
Block A - 1F - 15 Bedroom 1 (Double)	0.2	1.3	PASS
Block A - 1F - 15 Bedroom 2 (Double)	0.9	1.5	PASS
Block A - 1F - 15 Kitchen	0	N/A	PASS
Block A - 1F - 15 Living/Dining	0.1	N/A	PASS
Block A - 1F - 16 Bedroom1 (Double)	0.1	1.5	PASS
Block A - 1F - 16 Kitchen	0	N/A	PASS
Block A - 1F - 16 Living/Dining	0	N/A	PASS
Block A - 1F - 17 Bedroom 1 (Double)	0	1.6	PASS
Block A - 1F - 17 Bedroom 2 (Double)	0.8	2	PASS
Block A - 1F - 17 Kitchen	1.2	N/A	PASS
Block A - 1F - 17 Living/Dining	0.9	N/A	PASS
Block A - 1F - 18 Bedroom 1 (Double)	0	1	PASS
Block A - 1F - 18 Kitchen	0	N/A	PASS
Block A - 1F - 18 Living/Dining	0	N/A	PASS
Block A - 2F - 19 Bedroom 1 (Double)	1.8	3.5	PASS
Block A - 2F - 19 Bedroom 2 (Double)	1.1	2.3	PASS
Block A - 2F - 19 Kitchen	0	N/A	PASS
Block A - 2F - 19 Living/Dining	0	N/A	PASS
Block A - 2F - 20 Bedroom 1 (Double)	0	2.2	PASS
Block A - 2F - 20 Bedroom 2 (Double)	0	2.1	PASS
Block A - 2F - 20 Kitchen	0	N/A	PASS
Block A - 2F - 20 Living/Dining	0	N/A	PASS
Block A - 2F - 21 Bedroom 1 (Double)	0.6	5	PASS
Block A - 2F - 21 Bedroom 2 (Double)	1.5	5.5	PASS
Block A - 2F - 21 Kitchen	0	N/A	PASS
Block A - 2F - 21 Living/Dining	0.2	N/A	PASS
Block A - 2F - 22 Bedroom 1 (Double)	0.1	1.4	PASS
Block A - 2F - 22 Kitchen	0	N/A	PASS
Block A - 2F - 22 Living/Dining	0	N/A	PASS
Block A - 2F - 23 Bedroom 1 (Double)	0	1.2	PASS
Block A - 2F - 23 Bedroom 2 (Double)	0	3	PASS
Block A - 2F - 23 Kitchen	0	N/A	PASS
Block A - 2F - 23 Living/Dining	0.1	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 2F - 24 Bedroom 1 (Double)	0	1.4	PASS
Block A - 2F - 24 Bedroom 2 (Double)	0.2	3.6	PASS
Block A - 2F - 24 Kitchen	0	N/A	PASS
Block A - 2F - 24 Living/Dining	0.1	N/A	PASS
Block A - 2F - 25 Bedroom 1 (Double)	0.8	5.1	PASS
Block A - 2F - 25 Bedroom 2 (Double)	1.8	4.8	PASS
Block A - 2F - 25 Kitchen	0	N/A	PASS
Block A - 2F - 25 Living/Dining	0.2	N/A	PASS
Block A - 2F - 26 Bedroom 1 (Double)	0	1	PASS
Block A - 2F - 26 Kitchen	0	N/A	PASS
Block A - 2F - 26 Living/Dining	0	N/A	PASS
Block A - 2F - 27 Bedroom 1 (Double)	0	2.7	PASS
Block A - 2F - 27 Bedroom 2 (Double)	0	2.2	PASS
Block A - 2F - 27 Kitchen	0	N/A	PASS
Block A - 2F - 27 Living/Dining	0	N/A	PASS
Block A - 2F - 28 Bedroom 1 (Double)	1.7	3.6	PASS
Block A - 2F - 28 Bedroom 2 (Double)	0.6	2	PASS
Block A - 2F - 28 Kitchen	0.1	N/A	PASS
Block A - 2F - 28 Living/Dining	0.1	N/A	PASS
Block A - 3F - 29 Bedroom 1 (Double)	2.3	4	PASS
Block A - 3F - 29 Bedroom 2 (Double)	0.8	2.1	PASS
Block A - 3F - 29 Kitchen	0.2	N/A	PASS
Block A - 3F - 29 Living/Dining	0.6	N/A	PASS
Block A - 3F - 30 Bedroom 1 (Double)	0	1.9	PASS
Block A - 3F - 30 Bedroom 2 (Double)	0	1.7	PASS
Block A - 3F - 30 Kitchen	0	N/A	PASS
Block A - 3F - 30 Living/Dining	0	N/A	PASS
Block A - 3F - 31 Bedroom 1 (Double)	0.6	2.1	PASS
Block A - 3F - 31 Bedroom 2 (Double)	2.3	3.6	PASS
Block A - 3F - 31 Kitchen	0.1	N/A	PASS
Block A - 3F - 31 Living/Dining	0.7	N/A	PASS
Block A - 3F - 32 Bedroom 1 (Double)	0	1	PASS
Block A - 3F - 32 Kitchen	0	N/A	PASS
Block A - 3F - 32 Living/Dining	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 3F - 33 Bedroom 1 (Double)	0	1	PASS
Block A - 3F - 33 Bedroom 2 (Double)	0.4	3.2	PASS
Block A - 3F - 33 Bedroom 3 (Double)	0.5	2.6	PASS
Block A - 3F - 33 Kitchen	0.3	N/A	PASS
Block A - 3F - 33 Living/Dining	1.2	N/A	PASS
Block A - 3F - 34 Bedroom 1 (Double)	0	1	PASS
Block A - 3F - 34 Bedroom 2 (Double)	0.5	3.5	PASS
Block A - 3F - 34 Bedroom 3 (Double)	0.6	2.5	PASS
Block A - 3F - 34 Kitchen	0.3	N/A	PASS
Block A - 3F - 34 Living/Dining	1.2	N/A	PASS
Block A - 3F - 35 Bedroom 1 (Double)	0.6	2.1	PASS
Block A - 3F - 35 Bedroom 2 (Double)	1.7	1.6	PASS
Block A - 3F - 35 Kitchen	0.5	N/A	PASS
Block A - 3F - 35 Living/Dining	1.3	N/A	PASS
Block A - 3F - 36 Bedroom 1 (Double)	0	1	PASS
Block A - 3F - 36 Kitchen	0	N/A	PASS
Block A - 3F - 36 Living/Dining	0	N/A	PASS
Block A - 3F - 37 Bedroom 1 (Double)	0.1	2.8	PASS
Block A - 3F - 37 Bedroom 2 (Double)	0	5.3	PASS
Block A - 3F - 37 Kitchen	0.1	N/A	PASS
Block A - 3F - 37 Living/Dining	0.1	N/A	PASS
Block A - 4F - 38 Bedroom 1 (Double)	0.1	3.5	PASS
Block A - 4F - 38 Bedroom 2 (Double)	0	3.1	PASS
Block A - 4F - 38 Bedroom 3 (Single)	0	2.1	PASS
Block A - 4F - 38 Kitchen	0.6	N/A	PASS
Block A - 4F - 38 Living/Dining	1	N/A	PASS
Block A - 4F - 39 Bedroom 1 (Double)	0.9	3.3	PASS
Block A - 4F - 39 Bedroom 2 (Double)	0.1	3.1	PASS
Block A - 4F - 39 Kitchen	0.5	N/A	PASS
Block A - 4F - 39 Living/Dining	0.6	N/A	PASS
Block A - 4F - 40 Bedroom 1 (Double)	0.3	3.4	PASS
Block A - 4F - 40 Bedroom 2 (Double)	0	3.4	PASS
Block A - 4F - 40 Bedroom 3 (Double)	0	3.4	PASS
Block A - 4F - 40 Kitchen	1.4	N/A	PASS



	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 4F - 40 Living/Dining	1.3	N/A	PASS
Block A - 4F - 41 Bedroom 1 (Double)	0.6	4	PASS
Block A - 4F - 41 Bedroom 2 (Double)	0	6.3	PASS
Block A - 4F - 41 Bedroom 3 (Double)	0.1	6.7	PASS
Block A - 4F - 41 Kitchen	0.9	N/A	PASS
Block A - 4F - 41 Living/Dining	1	N/A	PASS
Block B - OF - 42 Bedroom 1 (Double)	0	0	PASS
Block B - OF - 42 Bedroom 2 (Double)	0	0	PASS
Block B - OF - 42 Kitchen	0	N/A	PASS
Block B - OF - 42 Living/Dining	0	N/A	PASS
Block B - OF - 43 Bedroom 1 (Double)	0	1	PASS
Block B - OF - 43 Bedroom 2 (Single)	0	0	PASS
Block B - OF - 43 Kitchen	0	N/A	PASS
Block B - OF - 43 Living/Dining	0	N/A	PASS
Block B - OF - 44 Bedroom 1 (Double)	0	0	PASS
Block B - OF - 44 Kitchen	0	N/A	PASS
Block B - OF - 44 Living/Dining	0	N/A	PASS
Block B - OF - 45 Bedroom 1 (Double)	0	0	PASS
Block B - OF - 45 Kitchen	0	N/A	PASS
Block B - OF - 45 Living/Dining	0	N/A	PASS
Block B - 1F - 46 Bedroom 1 (Double)	0	0	PASS
Block B - 1F - 46 Bedroom 2 (Single)	0	0	PASS
Block B - 1F - 46 Kitchen	0	N/A	PASS
Block B - 1F - 46 Living/Dining	0	N/A	PASS
Block B - 1F - 47 Bedroom 1 (Double)	0	0	PASS
Block B - 1F - 47 Bedroom 2 (Single)	0	0	PASS
Block B - 1F - 47 Kitchen	0	N/A	PASS
Block B - 1F - 47 Living/Dining	0	N/A	PASS
Block B - 1F - 48 Bedroom 1 (Double)	0	0	PASS
Block B - 1F - 48 Bedroom 2 (Double)	0	0	PASS
Block B - 1F - 48 Kitchen	0	N/A	PASS
Block B - 1F - 48 Living/Dining	0	N/A	PASS
Block B - 1F - 49 Bedroom 1 (Double)	0	0	PASS
Block B - 1F - 49 Kitchen	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block B - 1F - 49 Living/Dining	0	N/A	PASS
Block B - 1F - 50 Bedroom 1 (Double)	0	0	PASS
Block B - 1F - 50 Bedroom 2 (Double)	0	0	PASS
Block B - 1F - 50 Kitchen	0	N/A	PASS
Block B - 1F - 50 Living/Dining	0	N/A	PASS
Block B - 2F - 51 Bedroom 1 (Double)	0	0	PASS
Block B - 2F - 51 Bedroom 2 (Single)	0	0	PASS
Block B - 2F - 51 Kitchen	0.1	N/A	PASS
Block B - 2F - 51 Living/Dining	0	N/A	PASS
Block B - 2F - 52 Bedroom 1 (Double)	0	1	PASS
Block B - 2F - 52 Bedroom 2 (Single)	0	0	PASS
Block B - 2F - 52 Kitchen	0.1	N/A	PASS
Block B - 2F - 52 Living/Dining	0.1	N/A	PASS
Block B - 2F - 53 Bedroom 1 (Double)	0	1	PASS
Block B - 2F - 53 Bedroom 2 (Double)	0	0.9	PASS
Block B - 2F - 53 Kitchen	0.1	N/A	PASS
Block B - 2F - 53 Living/Dining	0.1	N/A	PASS
Block B - 2F - 54 Bedroom 1 (Double)	0	1.2	PASS
Block B - 2F - 54 Kitchen	0	N/A	PASS
Block B - 2F - 54 Living/Dining	0	N/A	PASS
Block B - 2F - 55 Bedroom 1 (Double)	0	0	PASS
Block B - 2F - 55 Bedroom 2 (Double)	0	0.9	PASS
Block B - 2F - 55 Kitchen	0.1	N/A	PASS
Block B - 2F - 55 Living/Dining	0	N/A	PASS
MT1 58 - OF - Bedroom 5 (Double)	0	1	PASS
MT1 58 - OF - Kitchen	0.4	N/A	PASS
MT1 58 - OF - Living/Dining	0.9	N/A	PASS
MT1 58 - 1F - Bedroom 4 (Double)	0	1.1	PASS
MT1 58 - 1F - Living	0	N/A	PASS
MT1 58 - 2F - Bedroom 1 (Double)	0	5.8	PASS
MT1 58 - 2F - Bedroom 2 (Double)	0	6	PASS
MT1 58 - 2F - Bedroom 3 (Double)	0	3.2	PASS
MT1 59 - OF - Bedroom 5 (Double)	0	1.5	PASS
MT1 59 - OF - Kitchen	0.6	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
MT1 59 - OF - Living/Dining	1.3	N/A	PASS
MT1 59 - 1F - Bedroom 4 (Double)	0	0	PASS
MT1 59 - 1F - Living	0	N/A	PASS
MT1 59 - 2F - Bedroom 1 (Double)	0	11.3	PASS
MT1 59 - 2F - Bedroom 2 (Double)	0	11.8	PASS
MT1 59 - 2F - Bedroom 3 (Double)	0	9.7	PASS
MT1 60 - OF - Bedroom 5 (Double)	0	5.8	PASS
MT1 60 - OF - Kitchen	0.7	N/A	PASS
MT1 60 - OF - Living/Dining	1.4	N/A	PASS
MT1 60 - 1F - Bedroom 4 (Double)	0	0	PASS
MT1 60 - 1F - Living	0	N/A	PASS
MT1 60 - 2F - Bedroom 1 (Double)	0	14.2	PASS
MT1 60 - 2F - Bedroom 2 (Double)	0	14.7	PASS
MT1 60 - 2F - Bedroom 3 (Double)	0	14	PASS
MT1 61 - OF - Bedroom 5 (Double)	0	6.4	PASS
MT1 61 - OF - Kitchen	0.8	N/A	PASS
MT1 61 - OF - Living/Dining	1.4	N/A	PASS
MT1 61 - 1F - Bedroom 4 (Double)	0	0	PASS
MT1 61 - 1F - Living	0	N/A	PASS
MT1 61 - 2F - Bedroom 1 (Double)	0	12.9	PASS
MT1 61 - 2F - Bedroom 2 (Double)	0	5	PASS
MT1 61 - 2F - Bedroom 3 (Double)	0	14.1	PASS
MT1 62 - OF - Bedroom 4 (Double)	0	6.4	PASS
MT1 62 - OF - Kitchen	0.4	N/A	PASS
MT1 62 - OF - Living/Dining	1.1	N/A	PASS
MT1 62 - 1F - Bedroom 3 (Double)	0	0	PASS
MT1 62 - 1F - Living	0	N/A	PASS
MT1 62 - 2F - Bedroom 2 (Double)	0	4.4	PASS
MT1 62 - 2F - Principle Bedroom (Double)	0	8.1	PASS
MT2 56 - OF - Kitchen	0.2	N/A	PASS
MT2 56 - OF - Living	0	N/A	PASS
MT2 56 - OF - Living/Dining	0.4	N/A	PASS
MT2 56 - 1F - Bedroom 2 (Double)	0	8.5	PASS
MT2 56 - 1F - Bedroom 3 (Double)	0	14.2	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
MT2 56 - 1F - Bedroom 4 (Single)	0	6.5	PASS
MT2 56 - 2F - Bedroom 1 (Double)	0.1	5.4	PASS
MT2 57 - OF - Kitchen	0.1	N/A	PASS
MT2 57 - OF - Living	0	N/A	PASS
MT2 57 - OF - Living/Dining	0.2	N/A	PASS
MT2 57 - 1F - Bedroom 2 (Double)	0	4.9	PASS
MT2 57 - 1F - Bedroom 3 (Double)	0	9.8	PASS
MT2 57 - 1F - Bedroom 4 (Single)	0	4.7	PASS
MT2 57 - 2F - Bedroom 1 (Double)	0	4.3	PASS

Table 5: TM59 Results Using DSY1 2050 Weather Data

#### 4.1.3 Communal Spaces

The communal corridors do not have any heat loss from distribution pipework and so do not need to be assessed as per CIBSE TM59.

However, the communal corridors and corridors within units have still been assessed as an additional measure to ensure the spaces do not overheat.

	DSY1 2020		DSY1 2050	
	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?
Block A - OF - 1 Hallway	0	NO	0	NO
Block A - OF - 2 Hallway	0	NO	0	NO
Block A - OF - 3 Hallway	0	NO	0	NO
Block A - OF - 4 Hallway	0	NO	0	NO
Block A - OF - 5 Hallway	0	NO	0	NO
Block A - OF - 6 Hallway	0	NO	0	NO
Block A - OF - 7 Hallway	0	NO	0	NO
Block A - OF - 8 Hallway	0	NO	0	NO
Block A - OF - Communal Corridor 1	0	NO	0	NO
Block A - OF - Communal Corridor 2	0	NO	0	NO
Block A - OF - Communal Corridor 3	0	NO	0	NO

	DSYI 2020		DSYI 2050	
	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?
Block A - 0F - Communal Corridor 4	0	NO	0	NO
Block A - 0F - Communal Lobby 1	0.6	NO	1.2	NO
Block A - 0F - Communal Lobby 2	0.3	NO	0.8	NO
Block A - 1F - 9 Hallway	0	NO	0	NO
Block A - 1F - 10 Hallway	0	NO	0	NO
Block A - 1F - 12 Hallway	0	NO	0	NO
Block A - 1F - 13 Corridor	0	NO	0	NO
Block A - 1F - 14 Hallway	0	NO	0	NO
Block A - 1F - 15 Hallway	0	NO	0	NO
Block A - 1F - 17 Hallway	0	NO	0	NO
Block A - 1F - 18 Hallway	0	NO	0	NO
Block A - 1F - Communal Corridor 1	0	NO	0	NO
Block A - 1F - Communal Corridor 2	0	NO	0	NO
Block A - 1F - Communal Corridor 3	0	NO	0	NO
Block A - 1F - Communal Corridor 4	0	NO	0	NO
Block A - 2F - 19 Hallway	0	NO	0	NO
Block A - 2F - 20 Hallway	0	NO	0	NO
Block A - 2F - 21 Hallway	0	NO	0	NO
Block A - 2F - 22 Hallway	0	NO	0	NO
Block A - 2F - 23 Corridor	0	NO	0	NO
Block A - 2F - 24 Hallway	0	NO	0	NO
Block A - 2F - 25 Hallway	0	NO	0	NO
Block A - 2F - 26 Hallway	0	NO	0	NO
Block A - 2F - 27 Hallway	0	NO	0	NO
Block A - 2F - 28 Hallway	0	NO	0	NO
Block A - 2F - Communal Corridor 1	0	NO	0	NO
Block A - 2F - Communal Corridor 2	0	NO	0	NO
Block A - 2F - Communal Corridor 3	0	NO	0	NO
Block A - 2F - Communal Corridor 4	0	NO	0	NO
Block A - 3F - 29 Hallway	0	NO	0	NO
Block A - 3F - 30 Hallway	0	NO	0	NO
Block A - 3F - 31 Hallway	0	NO	0	NO

	DSYI 2020		DSYI 2050	
	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?
Block A - 3F - 32 Hallway	0	NO	0	NO
Block A - 3F - 33 Hallway	0	NO	0	NO
Block A - 3F - 33 Hallway	0	NO	0	NO
Block A - 3F - 34 Hallway	0	NO	0	NO
Block A - 3F - 35 Hallway	0	NO	0	NO
Block A - 3F - 36 Hallway	0	NO	0	NO
Block A - 3F - 37 Hallway	0	NO	0	NO
Block A - 3F - Communal Corridor 1	0	NO	0	NO
Block A - 3F - Communal Corridor 2	0	NO	0	NO
Block A - 3F - Communal Corridor 3	0	NO	0	NO
Block A - 3F - Communal Corridor 4	0	NO	0	NO
Block A - 3F - Communal Stairway	1.7	NO	0	NO
Block A - 3F - Communal Stairway	1.7	NO	0	NO
Block A - 4F - 38 Hallway	0	NO	0	NO
Block A - 4F - 39 Hallway	0	NO	0	NO
Block A - 4F - 40 Hallway	0	NO	0	NO
Block A - 4F - 41 Hallway	0	NO	0	NO
Block A - 4F - Communal Corridor 1	0	NO	0	NO
Block A - 4F - Communal Corridor 2	0	NO	2.4	NO
Block A - 4F - Communal Corridor 3	0	NO	2.4	NO
Block A - 4F - Communal Stairway	1.4	NO	0	NO
Block A - 4F - Communal Stairway	1.4	NO	0	NO
Block B - OF - 42 Hall	0	NO	0	NO
Block B - OF - 43 Hall	0	NO	0	NO
Block B - OF - 44 Hall	0	NO	0	NO
Block B - OF - 45 Hall	0	NO	0	NO
Block B - OF - Lobby	0	NO	0	NO
Block B - OF - Stairwell 1	0	NO	0	NO
Block B - OF - Stairwell 2	0	NO	0	NO
Block B - 1F - 46 Hall	0	NO	0	NO
Block B - 1F - 47 Hall	0	NO	0	NO
Block B - 1F - 48 Hall	0	NO	0	NO

	DSYI 2020		DSYI 2050	
	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?
Block B - 1F - 49 Hall	0	NO	0	NO
Block B - 1F - DB Hall	0	NO	0	NO
Block B - 1F - Lobby	0	NO	0	NO
Block B - 1F - Stairwell 1	0	NO	0	NO
Block B - 1F - Stairwell 2	0	NO	0	NO
Block B - 2F - 51 Hall	0	NO	0	NO
Block B - 2F - 52 Hall	0	NO	0	NO
Block B - 2F - 53 Hall	0	NO	0	NO
Block B - 2F - 54 Hall	0	NO	0	NO
Block B - 2F - 55 Hall	0	NO	0	NO
Block B - 2F - Lobby	0	NO	0	NO
Block B - 2F - Stairwell 1	0	NO	0	NO
Block B - 2F - Stairwell 2	0	NO	0	NO
MT1 58 - OF - Hallway	0	NO	0	NO
MT1 58 - 1F - Landing	0	NO	0	NO
MT1 58 - 2F - Landing	0	NO	0	NO
MT1 59 - OF - Hallway	0	NO	0	NO
MT1 59 - 1F - Landing	0	NO	0	NO
MT1 59 - 2F - Landing	0	NO	0	NO
MT1 60 - OF - Hallway	0	NO	0	NO
MT1 60 - 1F - Landing	0	NO	0	NO
MT1 60 - 2F - Landing	0	NO	0	NO
MT1 61 - OF - Hallway	0	NO	0	NO
MT1 61 - 1F - Landing	0	NO	0	NO
MT1 61 - 2F - Landing	0	NO	0	NO
MT1 62 - OF - Hallway	0	NO	0	NO
MT1 62 - 1F - Landing	0	NO	0	NO
MT1 62 - 2F - Landing	0	NO	0	NO
MT2 56 - OF - Hallway	0	NO	0.1	NO
MT2 56 - 1F - Hallway	0	NO	0	NO
MT2 56 - 2F - Stairway	0	NO	0	NO
MT2 57 - OF - Hallway	0	NO	0.1	NO

	DSYI 2020		DSYI 2050	
	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?
MT2 57 - 1F - Hallway	0	NO	0	NO
MT2 57 - 2F - Stairway	0	NO	0	NO
Block A - OF - 1 Hallway	0	NO	0	NO
Block A - OF - 2 Hallway	0	NO	0	NO
Block A - OF - 3 Hallway	0	NO	0	NO
Block A - OF - 4 Hallway	0	NO	0	NO
Block A - OF - 5 Hallway	0	NO	0	NO
Block A - OF - 6 Hallway	0	NO	0	NO

Table 6: TM59 Results for corridors using DSYI 2020 and DSYI 2050

#### 4.1.4 Results – DSYI 2080 Weather Data

In line with the Bristol Council guidance, the model has also been assessed using the future weather year 2080. The results are reported in Table 7. The results show that a few spaces fail to meet the Bedroom criterion with the current design.

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - OF - 1 Bedroom 1 (Double)	0.1	11	PASS
Block A - OF - 1 Bedroom 2 (Double)	0.1	8	PASS
Block A - OF - 1 Kitchen	0	N/A	PASS
Block A - OF - 1 Living/Dining	0	N/A	PASS
Block A - OF - 2 Bedroom 2 (Double)	0	4.5	PASS
Block A - OF - 2 Bedroom 1 (Double)	0	5.5	PASS
Block A - OF - 2 Kitchen	0	N/A	PASS
Block A - OF - 2 Living/Dining	0	N/A	PASS
Block A - OF - 3 Bedroom 1 (Double)	0	1	PASS
Block A - OF - 3 Bedroom 2 (Double)	0	4.1	PASS
Block A - OF - 3 Kitchen	0	N/A	PASS
Block A - OF - 3 Living/Dining	0.1	N/A	PASS
Block A - OF - 4 Bedroom 1 (Double)	0	2.2	PASS
Block A - OF - 4 Bedroom 2 (Double)	0	1.1	PASS



	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - OF - 4 Kitchen	0	N/A	PASS
Block A - OF - 4 Living/Dining	0.1	N/A	PASS
Block A - OF - 5 Bedroom 1 (Double)	0	4.1	PASS
Block A - OF - 5 Bedroom 2 (Double)	0	1.1	PASS
Block A - OF - 5 Kitchen	0	N/A	PASS
Block A - OF - 5 Living/Dining	0.1	N/A	PASS
Block A - OF - 6 Bedroom 1 (Double)	0	1.1	PASS
Block A - OF - 6 Bedroom 2 (Double)	0	4.2	PASS
Block A - OF - 6 Kitchen	0	N/A	PASS
Block A - OF - 6 Living/Dining	0.1	N/A	PASS
Block A - OF - 7 Bedroom 1 (Double)	0.1	11.5	PASS
Block A - OF - 7 Bedroom 2 (Double)	0.1	8.5	PASS
Block A - OF - 7 Kitchen	0	N/A	PASS
Block A - OF - 7 Living/Dining	0	N/A	PASS
Block A - OF - 8 Bedroom 1 (Double)	0	5.6	PASS
Block A - OF - 8 Bedroom 2 (Double)	0	4.2	PASS
Block A - OF - 8 Kitchen	0	N/A	PASS
Block A - OF - 8 Living/Dining	0	N/A	PASS
Block A - 1F - 9 Bedroom 1 (Double)	0	5.3	PASS
Block A - 1F - 9 Bedroom 2 (Double)	0	2.7	PASS
Block A - 1F - 9 Kitchen	0	N/A	PASS
Block A - 1F - 9 Living/Dining	0	N/A	PASS
Block A - 1F - 10 Bedroom 1 (Double)	0	1	PASS
Block A - 1F - 10 Bedroom 2 (Double)	0	3.5	PASS
Block A - 1F - 10 Kitchen	0	N/A	PASS
Block A - 1F - 10 Living/Dining	0	N/A	PASS
Block A - 1F - 11 Bedroom 1 (Double)	0	2.6	PASS
Block A - 1F - 11 Kitchen	0	N/A	PASS
Block A - 1F - 11 Living/Dining	0	N/A	PASS
Block A - 1F - 12 Bedroom 1 (Double)	0	1.5	PASS
Block A - 1F - 12 Kitchen	0	N/A	PASS
Block A - 1F - 12 Living/Dining	0	N/A	PASS
Block A - 1F - 13 Bedroom 1 (Double)	0	4	PASS
Block A - 1F - 13 Bedroom 2 (Double)	0	2.5	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 1F - 13 Kitchen	0	N/A	PASS
Block A - 1F - 13 Living/Dining	0	N/A	PASS
Block A - 1F - 14 Bedroom 1 (Double)	0	3.8	PASS
Block A - 1F - 14 Bedroom 2 (Double)	0	3.1	PASS
Block A - 1F - 14 Kitchen	0	N/A	PASS
Block A - 1F - 14 Living/Dining	0.1	N/A	PASS
Block A - 1F - 15 Bedroom 1 (Double)	0	1	PASS
Block A - 1F - 15 Bedroom 2 (Double)	0	2	PASS
Block A - 1F - 15 Kitchen	0	N/A	PASS
Block A - 1F - 15 Living/Dining	0.1	N/A	PASS
Block A - 1F - 16 Bedroom1 (Double)	0	3.9	PASS
Block A - 1F - 16 Kitchen	0	N/A	PASS
Block A - 1F - 16 Living/Dining	0	N/A	PASS
Block A - 1F - 17 Bedroom 1 (Double)	0	4.5	PASS
Block A - 1F - 17 Bedroom 2 (Double)	0	2.7	PASS
Block A - 1F - 17 Kitchen	0.1	N/A	PASS
Block A - 1F - 17 Living/Dining	0.1	N/A	PASS
Block A - 1F - 18 Bedroom 1 (Double)	0	1.6	PASS
Block A - 1F - 18 Kitchen	0	N/A	PASS
Block A - 1F - 18 Living/Dining	0	N/A	PASS
Block A - 2F - 19 Bedroom 1 (Double)	0	8.9	PASS
Block A - 2F - 19 Bedroom 2 (Double)	0	1.5	PASS
Block A - 2F - 19 Kitchen	0	N/A	PASS
Block A - 2F - 19 Living/Dining	0.1	N/A	PASS
Block A - 2F - 20 Bedroom 1 (Double)	0	7.8	PASS
Block A - 2F - 20 Bedroom 2 (Double)	0	6	PASS
Block A - 2F - 20 Kitchen	0	N/A	PASS
Block A - 2F - 20 Living/Dining	0	N/A	PASS
Block A - 2F - 21 Bedroom 1 (Double)	0	7.9	PASS
Block A - 2F - 21 Bedroom 2 (Double)	0.2	11.6	PASS
Block A - 2F - 21 Kitchen	0	N/A	PASS
Block A - 2F - 21 Living/Dining	0	N/A	PASS
Block A - 2F - 22 Bedroom 1 (Double)	0	1.3	PASS
Block A - 2F - 22 Kitchen	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 2F - 22 Living/Dining	0	N/A	PASS
Block A - 2F - 23 Bedroom 1 (Double)	0	3.9	PASS
Block A - 2F - 23 Bedroom 2 (Double)	0	3.2	PASS
Block A - 2F - 23 Kitchen	0	N/A	PASS
Block A - 2F - 23 Living/Dining	0	N/A	PASS
Block A - 2F - 24 Bedroom 1 (Double)	0	3.8	PASS
Block A - 2F - 24 Bedroom 2 (Double)	0	5.6	PASS
Block A - 2F - 24 Kitchen	0	N/A	PASS
Block A - 2F - 24 Living/Dining	0.1	N/A	PASS
Block A - 2F - 25 Bedroom 1 (Double)	0	8.7	PASS
Block A - 2F - 25 Bedroom 2 (Double)	0.1	11.2	PASS
Block A - 2F - 25 Kitchen	0.1	N/A	PASS
Block A - 2F - 25 Living/Dining	0.1	N/A	PASS
Block A - 2F - 26 Bedroom 1 (Double)	0	1.4	PASS
Block A - 2F - 26 Kitchen	0	N/A	PASS
Block A - 2F - 26 Living/Dining	0	N/A	PASS
Block A - 2F - 27 Bedroom 1 (Double)	0	8.9	PASS
Block A - 2F - 27 Bedroom 2 (Double)	0	6.5	PASS
Block A - 2F - 27 Kitchen	0	N/A	PASS
Block A - 2F - 27 Living/Dining	0	N/A	PASS
Block A - 2F - 28 Bedroom 1 (Double)	0	11.1	PASS
Block A - 2F - 28 Bedroom 2 (Double)	0	2.8	PASS
Block A - 2F - 28 Kitchen	0.1	N/A	PASS
Block A - 2F - 28 Living/Dining	0.1	N/A	PASS
Block A - 3F - 29 Bedroom 1 (Double)	0	13.9	PASS
Block A - 3F - 29 Bedroom 2 (Double)	0	1.7	PASS
Block A - 3F - 29 Kitchen	0.1	N/A	PASS
Block A - 3F - 29 Living/Dining	0.2	N/A	PASS
Block A - 3F - 30 Bedroom 1 (Double)	0	6.8	PASS
Block A - 3F - 30 Bedroom 2 (Double)	0	4.3	PASS
Block A - 3F - 30 Kitchen	0	N/A	PASS
Block A - 3F - 30 Living/Dining	0	N/A	PASS
Block A - 3F - 31 Bedroom 1 (Double)	0	3.2	PASS
Block A - 3F - 31 Bedroom 2 (Double)	0	9.8	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 3F - 31 Kitchen	0.1	N/A	PASS
Block A - 3F - 31 Living/Dining	0.4	N/A	PASS
Block A - 3F - 32 Bedroom 1 (Double)	0	1.3	PASS
Block A - 3F - 32 Kitchen	0	N/A	PASS
Block A - 3F - 32 Living/Dining	0	N/A	PASS
Block A - 3F - 33 Bedroom 1 (Double)	0	1.2	PASS
Block A - 3F - 33 Bedroom 2 (Double)	0	4.4	PASS
Block A - 3F - 33 Bedroom 3 (Double)	0	4.3	PASS
Block A - 3F - 33 Kitchen	0.1	N/A	PASS
Block A - 3F - 33 Living/Dining	0.3	N/A	PASS
Block A - 3F - 34 Bedroom 1 (Double)	0	1.2	PASS
Block A - 3F - 34 Bedroom 2 (Double)	0	4.9	PASS
Block A - 3F - 34 Bedroom 3 (Double)	0	4.5	PASS
Block A - 3F - 34 Kitchen	0.2	N/A	PASS
Block A - 3F - 34 Living/Dining	0.5	N/A	PASS
Block A - 3F - 35 Bedroom 1 (Double)	0	1.7	PASS
Block A - 3F - 35 Bedroom 2 (Double)	0	1.5	PASS
Block A - 3F - 35 Kitchen	0.8	N/A	PASS
Block A - 3F - 35 Living/Dining	1.6	N/A	PASS
Block A - 3F - 36 Bedroom 1 (Double)	0	1.5	PASS
Block A - 3F - 36 Kitchen	0	N/A	PASS
Block A - 3F - 36 Living/Dining	0	N/A	PASS
Block A - 3F - 37 Bedroom 1 (Double)	0	10.9	PASS
Block A - 3F - 37 Bedroom 2 (Double)	0.1	12.5	PASS
Block A - 3F - 37 Kitchen	0.2	N/A	PASS
Block A - 3F - 37 Living/Dining	0.2	N/A	PASS
Block A - 4F - 38 Bedroom 1 (Double)	0.1	9.4	PASS
Block A - 4F - 38 Bedroom 2 (Double)	0	8	PASS
Block A - 4F - 38 Bedroom 3 (Single)	0	5.2	PASS
Block A - 4F - 38 Kitchen	1	N/A	PASS
Block A - 4F - 38 Living/Dining	1.4	N/A	PASS
Block A - 4F - 39 Bedroom 1 (Double)	1.2	10.1	PASS
Block A - 4F - 39 Bedroom 2 (Double)	0.2	8.5	PASS
Block A - 4F - 39 Kitchen	0.8	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 4F - 39 Living/Dining	1	N/A	PASS
Block A - 4F - 40 Bedroom 1 (Double)	0.5	9.8	PASS
Block A - 4F - 40 Bedroom 2 (Double)	0	7.5	PASS
Block A - 4F - 40 Bedroom 3 (Double)	0	7.9	PASS
Block A - 4F - 40 Kitchen	1.9	N/A	PASS
Block A - 4F - 40 Living/Dining	1.7	N/A	PASS
Block A - 4F - 41 Bedroom 1 (Double)	0.9	11	PASS
Block A - 4F - 41 Bedroom 2 (Double)	0	13.9	PASS
Block A - 4F - 41 Bedroom 3 (Double)	0.2	14.5	PASS
Block A - 4F - 41 Kitchen	1.5	N/A	PASS
Block A - 4F - 41 Living/Dining	1.5	N/A	PASS
Block B - OF - 42 Bedroom 1 (Double)	0	1	PASS
Block B - OF - 42 Bedroom 2 (Double)	0	1.3	PASS
Block B - OF - 42 Kitchen	0	N/A	PASS
Block B - OF - 42 Living/Dining	0.1	N/A	PASS
Block B - OF - 43 Bedroom 1 (Double)	0	8.2	PASS
Block B - OF - 43 Bedroom 2 (Single)	0	1.9	PASS
Block B - OF - 43 Kitchen	0	N/A	PASS
Block B - OF - 43 Living/Dining	0	N/A	PASS
Block B - OF - 44 Bedroom 1 (Double)	0	0.6	PASS
Block B - OF - 44 Kitchen	0	N/A	PASS
Block B - OF - 44 Living/Dining	0.1	N/A	PASS
Block B - OF - 45 Bedroom 1 (Double)	0	0	PASS
Block B - OF - 45 Kitchen	0	N/A	PASS
Block B - OF - 45 Living/Dining	0	N/A	PASS
Block B - 1F - 46 Bedroom 1 (Double)	0	1.2	PASS
Block B - 1F - 46 Bedroom 2 (Single)	0	0.9	PASS
Block B - 1F - 46 Kitchen	0	N/A	PASS
Block B - 1F - 46 Living/Dining	0	N/A	PASS
Block B - 1F - 47 Bedroom 1 (Double)	0	0.7	PASS
Block B - 1F - 47 Bedroom 2 (Single)	0	0	PASS
Block B - 1F - 47 Kitchen	0	N/A	PASS
Block B - 1F - 47 Living/Dining	0	N/A	PASS
Block B - 1F - 48 Bedroom 1 (Double)	0	0	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block B - 1F - 48 Bedroom 2 (Double)	0	0	PASS
Block B - 1F - 48 Kitchen	0	N/A	PASS
Block B - 1F - 48 Living/Dining	0	N/A	PASS
Block B - 1F - 49 Bedroom 1 (Double)	0	0.3	PASS
Block B - 1F - 49 Kitchen	0	N/A	PASS
Block B - 1F - 49 Living/Dining	0	N/A	PASS
Block B - 1F - 50 Bedroom 1 (Double)	0	0	PASS
Block B - 1F - 50 Bedroom 2 (Double)	0	1.2	PASS
Block B - 1F - 50 Kitchen	0	N/A	PASS
Block B - 1F - 50 Living/Dining	0	N/A	PASS
Block B - 2F - 51 Bedroom 1 (Double)	0	1.5	PASS
Block B - 2F - 51 Bedroom 2 (Single)	0	0.9	PASS
Block B - 2F - 51 Kitchen	0.1	N/A	PASS
Block B - 2F - 51 Living/Dining	0.1	N/A	PASS
Block B - 2F - 52 Bedroom 1 (Double)	0.1	4.3	PASS
Block B - 2F - 52 Bedroom 2 (Single)	0	1	PASS
Block B - 2F - 52 Kitchen	0.4	N/A	PASS
Block B - 2F - 52 Living/Dining	0.3	N/A	PASS
Block B - 2F - 53 Bedroom 1 (Double)	0	4.1	PASS
Block B - 2F - 53 Bedroom 2 (Double)	0	3.2	PASS
Block B - 2F - 53 Kitchen	0.4	N/A	PASS
Block B - 2F - 53 Living/Dining	0.3	N/A	PASS
Block B - 2F - 54 Bedroom 1 (Double)	0	5.7	PASS
Block B - 2F - 54 Kitchen	0.1	N/A	PASS
Block B - 2F - 54 Living/Dining	0.1	N/A	PASS
Block B - 2F - 55 Bedroom 1 (Double)	0	1.2	PASS
Block B - 2F - 55 Bedroom 2 (Double)	0	3.2	PASS
Block B - 2F - 55 Kitchen	0.2	N/A	PASS
Block B - 2F - 55 Living/Dining	0.2	N/A	PASS
MT1 58 - OF - Bedroom 5 (Double)	0	8.6	PASS
MT1 58 - OF - Kitchen	1.3	N/A	PASS
MT1 58 - OF - Living/Dining	1.6	N/A	PASS
MT1 58 - 1F - Bedroom 4 (Double)	0	9.8	PASS
MT1 58 - 1F - Living	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
MT1 58 - 2F - Bedroom 1 (Double)	0	18.4	PASS
MT1 58 - 2F - Bedroom 2 (Double)	0	19.3	PASS
MT1 58 - 2F - Bedroom 3 (Double)	0	12.6	PASS
MT1 59 - OF - Bedroom 5 (Double)	0	15	PASS
MT1 59 - OF - Kitchen	1.5	N/A	PASS
MT1 59 - OF - Living/Dining	2	N/A	PASS
MT1 59 - 1F - Bedroom 4 (Double)	0	0.7	PASS
MT1 59 - 1F - Living	0	N/A	PASS
MT1 59 - 2F - Bedroom 1 (Double)	0	29.2	PASS
MT1 59 - 2F - Bedroom 2 (Double)	0.1	30.4	PASS
MT1 59 - 2F - Bedroom 3 (Double)	0	22.8	PASS
MT1 60 - OF - Bedroom 5 (Double)	0	23.8	PASS
MT1 60 - OF - Kitchen	1.5	N/A	PASS
MT1 60 - OF - Living/Dining	2	N/A	PASS
MT1 60 - 1F - Bedroom 4 (Double)	0	0	PASS
MT1 60 - 1F - Living	0	N/A	PASS
MT1 60 - 2F - Bedroom 1 (Double)	0	36.2	FAIL
MT1 60 - 2F - Bedroom 2 (Double)	0.1	38.3	FAIL
MT1 60 - 2F - Bedroom 3 (Double)	0.1	35.1	FAIL
MT1 61 - OF - Bedroom 5 (Double)	0	26.2	PASS
MT1 61 - OF - Kitchen	1.6	N/A	PASS
MT1 61 - OF - Living/Dining	2.1	N/A	PASS
MT1 61 - 1F - Bedroom 4 (Double)	0	0	PASS
MT1 61 - 1F - Living	0	N/A	PASS
MT1 61 - 2F - Bedroom 1 (Double)	0	34.7	FAIL
MT1 61 - 2F - Bedroom 2 (Double)	0	15.3	PASS
MT1 61 - 2F - Bedroom 3 (Double)	0.1	35.9	FAIL
MT1 62 - OF - Bedroom 4 (Double)	0	25.1	PASS
MT1 62 - OF - Kitchen	1.1	N/A	PASS
MT1 62 - OF - Living/Dining	1.7	N/A	PASS
MT1 62 - 1F - Bedroom 3 (Double)	0	0	PASS
MT1 62 - 1F - Living	0	N/A	PASS
MT1 62 - 2F - Bedroom 2 (Double)	0	14.8	PASS
MT1 62 - 2F - Principle Bedroom (Double)	0	23.9	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
MT2 56 - OF - Kitchen	0.7	N/A	PASS
MT2 56 - OF - Living	0	N/A	PASS
MT2 56 - OF - Living/Dining	1.3	N/A	PASS
MT2 56 - 1F - Bedroom 2 (Double)	0.1	37.2	FAIL
MT2 56 - 1F - Bedroom 3 (Double)	0.1	46	FAIL
MT2 56 - 1F - Bedroom 4 (Single)	0.1	29.9	PASS
MT2 56 - 2F - Bedroom 1 (Double)	0.3	13.7	PASS
MT2 57 - OF - Kitchen	0.4	N/A	PASS
MT2 57 - OF - Living	0	N/A	PASS
MT2 57 - OF - Living/Dining	1.1	N/A	PASS
MT2 57 - 1F - Bedroom 2 (Double)	0	27.3	PASS
MT2 57 - 1F - Bedroom 3 (Double)	0	35.4	FAIL
MT2 57 - 1F - Bedroom 4 (Single)	0.1	20.5	PASS
MT2 57 - 2F - Bedroom 1 (Double)	0.1	11.8	PASS

Table 7: TM59 Results Using DSY1 2080 Weather Data (before retrofit measures)

The following retrofit measures will be required in the future to enable all the spaces to meet the TM59 and Part O criteria.

The following spaces will need an increased boost ventilation rate as per table 8 below.

Space Name	Boost Ventilation Rate (l/s)
MT1 60 - 2F - Bedroom 2 (Double)	12
MT1 60 - 2F - Bedroom 3 (Double)	15
MT1 61 - 2F - Bedroom 3 (Double)	15
MT1 60 - 2F - Bedroom 1 (Double)	15
MT1 61 - 2F - Bedroom 1 (Double)	15
MT2 56 - 1F - Bedroom 2 (Double)	15
MT2 56 - 1F - Bedroom 3 (Double)	15
MT2 57 - 1F - Bedroom 3 (Double)	15

Table 8: Retrofit Measure – Higher Mechanical Ventilation Boost Rates

Table 9 shows the results after retrofit measures.



	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - OF - 1 Bedroom 1 (Double)	0.1	11	PASS
Block A - OF - 1 Bedroom 2 (Double)	0.1	8	PASS
Block A - OF - 1 Kitchen	0	N/A	PASS
Block A - OF - 1 Living/Dining	0	N/A	PASS
Block A - OF - 2 Bedroom 2 (Double)	0	4.5	PASS
Block A - OF - 2 Bedroom 1 (Double)	0	5.5	PASS
Block A - OF - 2 Kitchen	0	N/A	PASS
Block A - OF - 2 Living/Dining	0	N/A	PASS
Block A - OF - 3 Bedroom 1 (Double)	0	1	PASS
Block A - OF - 3 Bedroom 2 (Double)	0	4.1	PASS
Block A - OF - 3 Kitchen	0	N/A	PASS
Block A - OF - 3 Living/Dining	0.1	N/A	PASS
Block A - OF - 4 Bedroom 1 (Double)	0	2.2	PASS
Block A - OF - 4 Bedroom 2 (Double)	0	1.1	PASS
Block A - OF - 4 Kitchen	0	N/A	PASS
Block A - OF - 4 Living/Dining	0.1	N/A	PASS
Block A - OF - 5 Bedroom 1 (Double)	0	4.1	PASS
Block A - OF - 5 Bedroom 2 (Double)	0	1.1	PASS
Block A - OF - 5 Kitchen	0	N/A	PASS
Block A - OF - 5 Living/Dining	0.1	N/A	PASS
Block A - OF - 6 Bedroom 1 (Double)	0	1.1	PASS
Block A - OF - 6 Bedroom 2 (Double)	0	4.2	PASS
Block A - OF - 6 Kitchen	0	N/A	PASS
Block A - OF - 6 Living/Dining	0.1	N/A	PASS
Block A - OF - 7 Bedroom 1 (Double)	0.1	11.5	PASS
Block A - OF - 7 Bedroom 2 (Double)	0.1	8.5	PASS
Block A - OF - 7 Kitchen	0	N/A	PASS
Block A - OF - 7 Living/Dining	0	N/A	PASS
Block A - OF - 8 Bedroom 1 (Double)	0	5.6	PASS
Block A - OF - 8 Bedroom 2 (Double)	0	4.2	PASS
Block A - OF - 8 Kitchen	0	N/A	PASS
Block A - OF - 8 Living/Dining	0	N/A	PASS
Block A - 1F - 9 Bedroom 1 (Double)	0	5.3	PASS
Block A - 1F - 9 Bedroom 2 (Double)	0	2.7	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 1F - 9 Kitchen	0	N/A	PASS
Block A - 1F - 9 Living/Dining	0	N/A	PASS
Block A - 1F - 10 Bedroom 1 (Double)	0	1	PASS
Block A - 1F - 10 Bedroom 2 (Double)	0	3.5	PASS
Block A - 1F - 10 Kitchen	0	N/A	PASS
Block A - 1F - 10 Living/Dining	0	N/A	PASS
Block A - 1F - 11 Bedroom 1 (Double)	0	2.6	PASS
Block A - 1F - 11 Kitchen	0	N/A	PASS
Block A - 1F - 11 Living/Dining	0	N/A	PASS
Block A - 1F - 12 Bedroom 1 (Double)	0	1.5	PASS
Block A - 1F - 12 Kitchen	0	N/A	PASS
Block A - 1F - 12 Living/Dining	0	N/A	PASS
Block A - 1F - 13 Bedroom 1 (Double)	0	4	PASS
Block A - 1F - 13 Bedroom 2 (Double)	0	2.5	PASS
Block A - 1F - 13 Kitchen	0	N/A	PASS
Block A - 1F - 13 Living/Dining	0	N/A	PASS
Block A - 1F - 14 Bedroom 1 (Double)	0	3.8	PASS
Block A - 1F - 14 Bedroom 2 (Double)	0	3.1	PASS
Block A - 1F - 14 Kitchen	0	N/A	PASS
Block A - 1F - 14 Living/Dining	0.1	N/A	PASS
Block A - 1F - 15 Bedroom 1 (Double)	0	1	PASS
Block A - 1F - 15 Bedroom 2 (Double)	0	2	PASS
Block A - 1F - 15 Kitchen	0	N/A	PASS
Block A - 1F - 15 Living/Dining	0.1	N/A	PASS
Block A - 1F - 16 Bedroom1 (Double)	0	3.9	PASS
Block A - 1F - 16 Kitchen	0	N/A	PASS
Block A - 1F - 16 Living/Dining	0	N/A	PASS
Block A - 1F - 17 Bedroom 1 (Double)	0	4.5	PASS
Block A - 1F - 17 Bedroom 2 (Double)	0	2.7	PASS
Block A - 1F - 17 Kitchen	0.1	N/A	PASS
Block A - 1F - 17 Living/Dining	0.1	N/A	PASS
Block A - 1F - 18 Bedroom 1 (Double)	0	1.6	PASS
Block A - 1F - 18 Kitchen	0	N/A	PASS
Block A - 1F - 18 Living/Dining	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 2F - 19 Bedroom 1 (Double)	0	8.9	PASS
Block A - 2F - 19 Bedroom 2 (Double)	0	1.5	PASS
Block A - 2F - 19 Kitchen	0	N/A	PASS
Block A - 2F - 19 Living/Dining	0.1	N/A	PASS
Block A - 2F - 20 Bedroom 1 (Double)	0	7.8	PASS
Block A - 2F - 20 Bedroom 2 (Double)	0	6	PASS
Block A - 2F - 20 Kitchen	0	N/A	PASS
Block A - 2F - 20 Living/Dining	0	N/A	PASS
Block A - 2F - 21 Bedroom 1 (Double)	0	7.9	PASS
Block A - 2F - 21 Bedroom 2 (Double)	0.2	11.6	PASS
Block A - 2F - 21 Kitchen	0	N/A	PASS
Block A - 2F - 21 Living/Dining	0	N/A	PASS
Block A - 2F - 22 Bedroom 1 (Double)	0	1.3	PASS
Block A - 2F - 22 Kitchen	0	N/A	PASS
Block A - 2F - 22 Living/Dining	0	N/A	PASS
Block A - 2F - 23 Bedroom 1 (Double)	0	3.9	PASS
Block A - 2F - 23 Bedroom 2 (Double)	0	3.2	PASS
Block A - 2F - 23 Kitchen	0	N/A	PASS
Block A - 2F - 23 Living/Dining	0	N/A	PASS
Block A - 2F - 24 Bedroom 1 (Double)	0	3.8	PASS
Block A - 2F - 24 Bedroom 2 (Double)	0	5.6	PASS
Block A - 2F - 24 Kitchen	0	N/A	PASS
Block A - 2F - 24 Living/Dining	0.1	N/A	PASS
Block A - 2F - 25 Bedroom 1 (Double)	0	8.7	PASS
Block A - 2F - 25 Bedroom 2 (Double)	0.1	11.2	PASS
Block A - 2F - 25 Kitchen	0.1	N/A	PASS
Block A - 2F - 25 Living/Dining	0.1	N/A	PASS
Block A - 2F - 26 Bedroom 1 (Double)	0	1.4	PASS
Block A - 2F - 26 Kitchen	0	N/A	PASS
Block A - 2F - 26 Living/Dining	0	N/A	PASS
Block A - 2F - 27 Bedroom 1 (Double)	0	8.9	PASS
Block A - 2F - 27 Bedroom 2 (Double)	0	6.5	PASS
Block A - 2F - 27 Kitchen	0	N/A	PASS
Block A - 2F - 27 Living/Dining	0	N/A	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 2F - 28 Bedroom 1 (Double)	0	11.1	PASS
Block A - 2F - 28 Bedroom 2 (Double)	0	2.8	PASS
Block A - 2F - 28 Kitchen	0.1	N/A	PASS
Block A - 2F - 28 Living/Dining	0.1	N/A	PASS
Block A - 3F - 29 Bedroom 1 (Double)	0	13.9	PASS
Block A - 3F - 29 Bedroom 2 (Double)	0	1.7	PASS
Block A - 3F - 29 Kitchen	0.1	N/A	PASS
Block A - 3F - 29 Living/Dining	0.2	N/A	PASS
Block A - 3F - 30 Bedroom 1 (Double)	0	6.8	PASS
Block A - 3F - 30 Bedroom 2 (Double)	0	4.3	PASS
Block A - 3F - 30 Kitchen	0	N/A	PASS
Block A - 3F - 30 Living/Dining	0	N/A	PASS
Block A - 3F - 31 Bedroom 1 (Double)	0	3.2	PASS
Block A - 3F - 31 Bedroom 2 (Double)	0	9.8	PASS
Block A - 3F - 31 Kitchen	0.1	N/A	PASS
Block A - 3F - 31 Living/Dining	0.4	N/A	PASS
Block A - 3F - 32 Bedroom 1 (Double)	0	1.3	PASS
Block A - 3F - 32 Kitchen	0	N/A	PASS
Block A - 3F - 32 Living/Dining	0	N/A	PASS
Block A - 3F - 33 Bedroom 1 (Double)	0	1.2	PASS
Block A - 3F - 33 Bedroom 2 (Double)	0	4.4	PASS
Block A - 3F - 33 Bedroom 3 (Double)	0	4.3	PASS
Block A - 3F - 33 Kitchen	0.1	N/A	PASS
Block A - 3F - 33 Living/Dining	0.3	N/A	PASS
Block A - 3F - 34 Bedroom 1 (Double)	0	1.2	PASS
Block A - 3F - 34 Bedroom 2 (Double)	0	4.9	PASS
Block A - 3F - 34 Bedroom 3 (Double)	0	4.5	PASS
Block A - 3F - 34 Kitchen	0.2	N/A	PASS
Block A - 3F - 34 Living/Dining	0.5	N/A	PASS
Block A - 3F - 35 Bedroom 1 (Double)	0	1.7	PASS
Block A - 3F - 35 Bedroom 2 (Double)	0	1.5	PASS
Block A - 3F - 35 Kitchen	0.8	N/A	PASS
Block A - 3F - 35 Living/Dining	1.6	N/A	PASS
Block A - 3F - 36 Bedroom 1 (Double)	0	1.5	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block A - 3F - 36 Kitchen	0	N/A	PASS
Block A - 3F - 36 Living/Dining	0	N/A	PASS
Block A - 3F - 37 Bedroom 1 (Double)	0	10.9	PASS
Block A - 3F - 37 Bedroom 2 (Double)	0.1	12.5	PASS
Block A - 3F - 37 Kitchen	0.2	N/A	PASS
Block A - 3F - 37 Living/Dining	0.2	N/A	PASS
Block A - 4F - 38 Bedroom 1 (Double)	0.1	9.4	PASS
Block A - 4F - 38 Bedroom 2 (Double)	0	8	PASS
Block A - 4F - 38 Bedroom 3 (Single)	0	5.2	PASS
Block A - 4F - 38 Kitchen	1	N/A	PASS
Block A - 4F - 38 Living/Dining	1.4	N/A	PASS
Block A - 4F - 39 Bedroom 1 (Double)	1.2	10.1	PASS
Block A - 4F - 39 Bedroom 2 (Double)	0.2	8.5	PASS
Block A - 4F - 39 Kitchen	0.8	N/A	PASS
Block A - 4F - 39 Living/Dining	1	N/A	PASS
Block A - 4F - 40 Bedroom 1 (Double)	0.5	9.8	PASS
Block A - 4F - 40 Bedroom 2 (Double)	0	7.5	PASS
Block A - 4F - 40 Bedroom 3 (Double)	0	7.9	PASS
Block A - 4F - 40 Kitchen	1.9	N/A	PASS
Block A - 4F - 40 Living/Dining	1.7	N/A	PASS
Block A - 4F - 41 Bedroom 1 (Double)	0.9	11	PASS
Block A - 4F - 41 Bedroom 2 (Double)	0	13.9	PASS
Block A - 4F - 41 Bedroom 3 (Double)	0.2	14.5	PASS
Block A - 4F - 41 Kitchen	1.5	N/A	PASS
Block A - 4F - 41 Living/Dining	1.5	N/A	PASS
Block B - OF - 42 Bedroom 1 (Double)	0	1	PASS
Block B - OF - 42 Bedroom 2 (Double)	0	1.3	PASS
Block B - OF - 42 Kitchen	0	N/A	PASS
Block B - OF - 42 Living/Dining	0.1	N/A	PASS
Block B - OF - 43 Bedroom 1 (Double)	0	8.2	PASS
Block B - OF - 43 Bedroom 2 (Single)	0	1.9	PASS
Block B - OF - 43 Kitchen	0	N/A	PASS
Block B - OF - 43 Living/Dining	0	N/A	PASS
Block B - OF - 44 Bedroom 1 (Double)	0	0.6	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block B - OF - 44 Kitchen	0	N/A	PASS
Block B - OF - 44 Living/Dining	0.1	N/A	PASS
Block B - OF - 45 Bedroom 1 (Double)	0	0	PASS
Block B - OF - 45 Kitchen	0	N/A	PASS
Block B - OF - 45 Living/Dining	0	N/A	PASS
Block B - 1F - 46 Bedroom 1 (Double)	0	1.2	PASS
Block B - 1F - 46 Bedroom 2 (Single)	0	0.9	PASS
Block B - 1F - 46 Kitchen	0	N/A	PASS
Block B - 1F - 46 Living/Dining	0	N/A	PASS
Block B - 1F - 47 Bedroom 1 (Double)	0	0.7	PASS
Block B - 1F - 47 Bedroom 2 (Single)	0	0	PASS
Block B - 1F - 47 Kitchen	0	N/A	PASS
Block B - 1F - 47 Living/Dining	0	N/A	PASS
Block B - 1F - 48 Bedroom 1 (Double)	0	0	PASS
Block B - 1F - 48 Bedroom 2 (Double)	0	0	PASS
Block B - 1F - 48 Kitchen	0	N/A	PASS
Block B - 1F - 48 Living/Dining	0	N/A	PASS
Block B - 1F - 49 Bedroom 1 (Double)	0	0.3	PASS
Block B - 1F - 49 Kitchen	0	N/A	PASS
Block B - 1F - 49 Living/Dining	0	N/A	PASS
Block B - 1F - 50 Bedroom 1 (Double)	0	0	PASS
Block B - 1F - 50 Bedroom 2 (Double)	0	1.2	PASS
Block B - 1F - 50 Kitchen	0	N/A	PASS
Block B - 1F - 50 Living/Dining	0	N/A	PASS
Block B - 2F - 51 Bedroom 1 (Double)	0	1.5	PASS
Block B - 2F - 51 Bedroom 2 (Single)	0	1	PASS
Block B - 2F - 51 Kitchen	0.1	N/A	PASS
Block B - 2F - 51 Living/Dining	0.1	N/A	PASS
Block B - 2F - 52 Bedroom 1 (Double)	0.1	4.3	PASS
Block B - 2F - 52 Bedroom 2 (Single)	0	1	PASS
Block B - 2F - 52 Kitchen	0.4	N/A	PASS
Block B - 2F - 52 Living/Dining	0.3	N/A	PASS
Block B - 2F - 53 Bedroom 1 (Double)	0	4.3	PASS
Block B - 2F - 53 Bedroom 2 (Double)	0	3.5	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
Block B - 2F - 53 Kitchen	0.4	N/A	PASS
Block B - 2F - 53 Living/Dining	0.3	N/A	PASS
Block B - 2F - 54 Bedroom 1 (Double)	0	5.8	PASS
Block B - 2F - 54 Kitchen	0.1	N/A	PASS
Block B - 2F - 54 Living/Dining	0.1	N/A	PASS
Block B - 2F - 55 Bedroom 1 (Double)	0	1.3	PASS
Block B - 2F - 55 Bedroom 2 (Double)	0	3.5	PASS
Block B - 2F - 55 Kitchen	0.2	N/A	PASS
Block B - 2F - 55 Living/Dining	0.2	N/A	PASS
MT1 58 - OF - Bedroom 5 (Double)	0	8.3	PASS
MT1 58 - OF - Kitchen	1.3	N/A	PASS
MT1 58 - OF - Living/Dining	1.6	N/A	PASS
MT1 58 - 1F - Bedroom 4 (Double)	0	9.6	PASS
MT1 58 - 1F - Living	0	N/A	PASS
MT1 58 - 2F - Bedroom 1 (Double)	0	17.3	PASS
MT1 58 - 2F - Bedroom 2 (Double)	0	18.3	PASS
MT1 58 - 2F - Bedroom 3 (Double)	0	12.2	PASS
MT1 59 - OF - Bedroom 5 (Double)	0	14.6	PASS
MT1 59 - OF - Kitchen	1.5	N/A	PASS
MT1 59 - OF - Living/Dining	2	N/A	PASS
MT1 59 - 1F - Bedroom 4 (Double)	0	0.7	PASS
MT1 59 - 1F - Living	0	N/A	PASS
MT1 59 - 2F - Bedroom 1 (Double)	0	22.7	PASS
MT1 59 - 2F - Bedroom 2 (Double)	0.1	27	PASS
MT1 59 - 2F - Bedroom 3 (Double)	0	17.8	PASS
MT1 60 - OF - Bedroom 5 (Double)	0	22.8	PASS
MT1 60 - OF - Kitchen	1.5	N/A	PASS
MT1 60 - OF - Living/Dining	2	N/A	PASS
MT1 60 - 1F - Bedroom 4 (Double)	0	0	PASS
MT1 60 - 1F - Living	0	N/A	PASS
MT1 60 - 2F - Bedroom 1 (Double)	0	13.7	PASS
MT1 60 - 2F - Bedroom 2 (Double)	0	20	PASS
MT1 60 - 2F - Bedroom 3 (Double)	0	13.1	PASS
MT1 61 - OF - Bedroom 5 (Double)	0	25.4	PASS

	TM52	Bedrooms Only	TM59
	Criterion 1 (%Hrs Top-Tmax>=1K)	No hours > 26°C	Pass/Fail
MT1 61 - OF - Kitchen	1.6	N/A	PASS
MT1 61 - OF - Living/Dining	2.1	N/A	PASS
MT1 61 - 1F - Bedroom 4 (Double)	0	0	PASS
MT1 61 - 1F - Living	0	N/A	PASS
MT1 61 - 2F - Bedroom 1 (Double)	0	14.8	PASS
MT1 61 - 2F - Bedroom 2 (Double)	0	13	PASS
MT1 61 - 2F - Bedroom 3 (Double)	0	12	PASS
MT1 62 - OF - Bedroom 4 (Double)	0	24.8	PASS
MT1 62 - OF - Kitchen	1.1	N/A	PASS
MT1 62 - OF - Living/Dining	1.7	N/A	PASS
MT1 62 - 1F - Bedroom 3 (Double)	0	0	PASS
MT1 62 - 1F - Living	0	N/A	PASS
MT1 62 - 2F - Bedroom 2 (Double)	0	13.5	PASS
MT1 62 - 2F - Principle Bedroom (Double)	0	19.6	PASS
MT2 56 - OF - Kitchen	0.7	N/A	PASS
MT2 56 - OF - Living	0	N/A	PASS
MT2 56 - OF - Living/Dining	1.3	N/A	PASS
MT2 56 - 1F - Bedroom 2 (Double)	0	15.8	PASS
MT2 56 - 1F - Bedroom 3 (Double)	0	23.7	PASS
MT2 56 - 1F - Bedroom 4 (Single)	0.1	24.4	PASS
MT2 56 - 2F - Bedroom 1 (Double)	0.3	13.7	PASS
MT2 57 - OF - Kitchen	0.4	N/A	PASS
MT2 57 - OF - Living	0	N/A	PASS
MT2 57 - OF - Living/Dining	1.1	N/A	PASS
MT2 57 - 1F - Bedroom 2 (Double)	0	25.5	PASS
MT2 57 - 1F - Bedroom 3 (Double)	0	16.3	PASS
MT2 57 - 1F - Bedroom 4 (Single)	0.1	17	PASS
MT2 57 - 2F - Bedroom 1 (Double)	0.1	11.8	PASS

Table 9: TM59 Results Using DSYI 2080 Weather Data (after retrofit measures)

#### 4.1.5 Communal Spaces (DSYI 2080)

The communal corridors do not have any heat loss from distribution pipework and so do not need to be assessed as per CIBSE TM59.



However, communal corridors and corridors within units have still been assessed as an additional measure to ensure the spaces do not overheat.

	DSY 1 2080 (before retrofit measures)		DSY 1 2080 (after retrofit measures)	
	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?
Block A - OF - 1 Hallway	0	NO	0	NO
Block A - OF - 2 Hallway	0	NO	0	NO
Block A - OF - 3 Hallway	0	NO	0	NO
Block A - OF - 4 Hallway	0	NO	0	NO
Block A - OF - 5 Hallway	0	NO	0	NO
Block A - OF - 6 Hallway	0	NO	0	NO
Block A - OF - 7 Hallway	0	NO	0	NO
Block A - OF - 8 Hallway	0	NO	0	NO
Block A - OF - Communal Corridor 1	0	NO	0	NO
Block A - OF - Communal Corridor 2	0	NO	0	NO
Block A - OF - Communal Corridor 3	0	NO	0	NO
Block A - OF - Communal Corridor 4	0	NO	0	NO
Block A - OF - Communal Lobby 1	0	NO	0	NO
Block A - OF - Communal Lobby 2	0	NO	0	NO
Block A - 1F - 9 Hallway	0	NO	0	NO
Block A - 1F - 10 Hallway	0	NO	0	NO
Block A - 1F - 12 Hallway	0	NO	0	NO
Block A - 1F - 13 Corridor	0	NO	0	NO
Block A - 1F - 14 Hallway	0	NO	0	NO
Block A - 1F - 15 Hallway	0	NO	0	NO
Block A - 1F - 17 Hallway	0	NO	0	NO
Block A - 1F - 18 Hallway	0	NO	0	NO
Block A - 1F - Communal Corridor 1	0	NO	0	NO
Block A - 1F - Communal Corridor 2	0	NO	0	NO
Block A - 1F - Communal Corridor 3	0	NO	0	NO
Block A - 1F - Communal Corridor 4	0	NO	0	NO
Block A - 2F - 19 Hallway	0	NO	0	NO
Block A - 2F - 20 Hallway	0	NO	0	NO
Block A - 2F - 21 Hallway	0	NO	0	NO

	DSY 1 2080 (before retrofit measures)		DSY 1 2080 (after retrofit measures)	
	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?
Block A - 2F - 22 Hallway	0	NO	0	NO
Block A - 2F - 23 Corridor	0	NO	0	NO
Block A - 2F - 24 Hallway	0	NO	0	NO
Block A - 2F - 25 Hallway	0	NO	0	NO
Block A - 2F - 26 Hallway	0	NO	0	NO
Block A - 2F - 27 Hallway	0	NO	0	NO
Block A - 2F - 28 Hallway	0	NO	0	NO
Block A - 2F - Communal Corridor 1	0	NO	0	NO
Block A - 2F - Communal Corridor 2	0	NO	0	NO
Block A - 2F - Communal Corridor 3	0	NO	0	NO
Block A - 2F - Communal Corridor 4	0	NO	0	NO
Block A - 3F - 29 Hallway	0	NO	0	NO
Block A - 3F - 30 Hallway	0	NO	0	NO
Block A - 3F - 31 Hallway	0	NO	0	NO
Block A - 3F - 32 Hallway	0	NO	0	NO
Block A - 3F - 33 Hallway	0	NO	0	NO
Block A - 3F - 33 Hallway	0	NO	0	NO
Block A - 3F - 34 Hallway	0	NO	0	NO
Block A - 3F - 35 Hallway	0	NO	0	NO
Block A - 3F - 36 Hallway	0	NO	0	NO
Block A - 3F - 37 Hallway	0	NO	0	NO
Block A - 3F - Communal Corridor 1	0	NO	0	NO
Block A - 3F - Communal Corridor 2	0	NO	0	NO
Block A - 3F - Communal Corridor 3	0	NO	0	NO
Block A - 3F - Communal Corridor 4	0	NO	0	NO
Block A - 4F - 38 Hallway	0.1	NO	0.1	NO
Block A - 4F - 39 Hallway	0.1	NO	0.1	NO
Block A - 4F - 40 Hallway	0.1	NO	0.1	NO
Block A - 4F - 41 Hallway	0.1	NO	0.1	NO
Block A - 4F - Communal Corridor 1	0.1	NO	0.1	NO
Block A - 4F - Communal Corridor 2	0.2	NO	0.2	NO

	DSY 1 2080 (before retrofit measures)		DSY 1 2080 (after retrofit measures)	
	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?
Block A - 4F - Communal Corridor 3	0.3	NO	0.3	NO
Block B - OF - 42 Hall	0	NO	0	NO
Block B - OF - 43 Hall	0	NO	0	NO
Block B - OF - 44 Hall	0	NO	0	NO
Block B - OF - 45 Hall	0	NO	0	NO
Block B - OF - Lobby	0	NO	0	NO
Block B - OF - Stairwell 1	0	NO	0	NO
Block B - OF - Stairwell 2	0	NO	0	NO
Block B - 1F - 46 Hall	0	NO	0	NO
Block B - 1F - 47 Hall	0	NO	0	NO
Block B - 1F - 48 Hall	0	NO	0	NO
Block B - 1F - 49 Hall	0	NO	0	NO
Block B - 1F - DB Hall	0	NO	0	NO
Block B - 1F - Lobby	0	NO	0	NO
Block B - 1F - Stairwell 1	0	NO	0	NO
Block B - 1F - Stairwell 2	0	NO	0	NO
Block B - 2F - 51 Hall	0	NO	0	NO
Block B - 2F - 52 Hall	0	NO	0	NO
Block B - 2F - 53 Hall	0	NO	0	NO
Block B - 2F - 54 Hall	0	NO	0	NO
Block B - 2F - 55 Hall	0	NO	0	NO
Block B - 2F - Lobby	0	NO	0	NO
Block B - 2F - Stairwell 1	0	NO	0.1	NO
Block B - 2F - Stairwell 2	0	NO	0	NO
MT1 58 - OF - Hallway	0	NO	0	NO
MT1 58 - 1F - Landing	0	NO	0	NO
MT1 58 - 2F - Landing	0	NO	0	NO
MT1 59 - OF - Hallway	0	NO	0	NO
MT1 59 - 1F - Landing	0	NO	0	NO
MT1 59 - 2F - Landing	0.1	NO	0.1	NO
MT1 60 - OF - Hallway	0	NO	0	NO

	DSY1 2080 (before retrofit measures)		DSY1 2080 (after retrofit measures)	
	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?	Operative temperature (°C) - % hours in range > 28.00	Risk of overheating?
MT1 60 - 1F - Landing	0	NO	0	NO
MT1 60 - 2F - Landing	0.1	NO	0	NO
MT1 61 - 0F - Hallway	0	NO	0	NO
MT1 61 - 1F - Landing	0	NO	0	NO
MT1 61 - 2F - Landing	0.1	NO	0	NO
MT1 62 - 0F - Hallway	0	NO	0	NO
MT1 62 - 1F - Landing	0	NO	0	NO
MT1 62 - 2F - Landing	0.1	NO	0	NO
MT2 56 - 0F - Hallway	0	NO	0	NO
MT2 56 - 1F - Hallway	0.2	NO	0.1	NO
MT2 56 - 2F - Stairway	0.4	NO	0.3	NO
MT2 57 - 0F - Hallway	0	NO	0	NO
MT2 57 - 1F - Hallway	0.2	NO	0.1	NO
MT2 57 - 2F - Stairway	0.4	NO	0.4	NO

Table 10: TM59 Results for corridors using DSY1 2080 before and after retrofit measures

## 4.2 TM52 COMPLIANCE

The Study rooms don't fall under the TM59 or Part O guidance and hence have been assessed against CIBSE TM52 criteria.

As seen in table 11, 12 and 13 below, all the Study rooms pass the TM52 criteria. The rooflights in study rooms need to be openable as stated in section 3.2.2.

Spaces	TM52			
	Criterion 1 (%Hrs Top-Tmax>=1K)	Criteria 2: (Max. Daily Deg.Hrs)	Criterion 3 (Max.DeltaT)	Pass/Fail
Block A - 4F - 41 Study	0	0	0	PASS
MT1 62 - 1F - Study	0	0	0	PASS
MT2 56 - 1F - Study	0	0	0	PASS
MT2 57 - 1F - Study	0	0	0	PASS

Table 11: TM52 Results Using DSY1 2020 Weather Data

Spaces	TM52			
	Criterion 1 (%Hrs Top-Tmax>=1K)	Criteria 2: (Max. Daily Deg.Hrs)	Criterion 3 (Max.DeltaT)	Pass/Fail
Block A - 4F - 41 Study	0.2	1.5	1	PASS
MT1 62 - 1F - Study	0	0	0	PASS
MT2 56 - 1F - Study	0	0	0	PASS
MT2 57 - 1F - Study	0	0	0	PASS

Table 12: TM52 Results Using DSY1 2050 Weather Data

Spaces	TM52			
	Criterion 1 (%Hrs Top-Tmax>=1K)	Criteria 2: (Max. Daily Deg.Hrs)	Criterion 3 (Max.DeltaT)	Pass/Fail
Block A - 4F - 41 Study	0.9	3.7	1	PASS
MT1 62 - 1F - Study	0.1	1	1	PASS
MT2 56 - 1F - Study	0.8	5.4	1	PASS
MT2 57 - 1F - Study	0.8	5.2	1	PASS

Table 12: TM52 Results Using DSY1 2080 Weather Data

## 5. CONCLUSION

In summary, based on the details modelled in this report, and a typical summer scenario, compliance with TM59 and Part O targets have been met for all spaces when assessed against the DSY1 2020 50% high emissions and DSY1 2050 50% medium emissions weather files.

The results show that the rooms get warmer when assessed under more extreme design weather years, which is to be expected.

A few rooms fail the Bedroom criterion when assessed against the 2080 weather file scenario. Future retrofit measures have been suggested to enable the spaces to meet the required criteria.

It should be noted that the current assessment does not include for internal blinds or curtains since these can vary considerably in performance and are normally installed by the occupant. Additionally, these are to be excluded as per Part O guidance.

As general guidance to occupants during heat waves, curtains or blinds could certainly be utilised to reduce operative temperatures, especially if used correctly.

In general (and if safe to do so), curtains and windows should be left open at night to allow cooler, night time air to flow freely and reduce the air temperature of the rooms to as low as possible by morning. Curtains should then be closed when occupants wake to minimise solar gains that enter the flats from that point forward.

If the flat is to be unoccupied during the day, closing the windows as well as the blinds early in the morning might help to preserve the cooler, night time air and keep out the warmer external air, thus resulting in lower temperatures when the occupant returns later in the day.

If the flat is to be occupied during the day, keeping internal doors open during day time hours is advisable to facilitate cross ventilation. Most of the apartments in this building benefit from having at least two facades and so this approach should result in higher ventilation rates.

In addition, air movement speed can be a significant factor in occupant perception of temperature. During heat waves, we would recommend that occupants have access to localised fans.

There are a number of assumptions made in this report that should be carefully reviewed when using these results to determine design strategies for the proposed building going forward. Details relating to façade openings, internal gains, occupancies and building fabric details are all critical in determining the thermal comfort conditions occurring in each space so should be scrutinised appropriately to ensure any simulation of the building is an accurate reflection of the conditions likely to occur in each space when the building is in use.

There are a number of limitations in the modelling associated with the outputs in this report. In some cases window openings have been set to open at a given temperature, where in reality, their ability to open is solely reliant upon the occupants in the room. It is highly likely that some windows will be opened sooner and some will be opened later. Computer modelling cannot truly represent the actions (or inaction) of people.

Finally, it is important to consider that benchmarks set out in the legislation referred to in analysis cannot truly measure whether an individual will be "comfortable". The analysis can only ever be read as guidance and should never be seen as an absolute guarantee of either performance or comfort. At best it should be seen as an indicator of what many people might think, most of the time.

Therefore, it is recommended that the client for this project should try to understand this report, seek advice from the design team and review their own thoughts on comfort levels. Only once this has occurred will the client be in a position to decide on whether the level of comfort indicated in this report is likely to be acceptable once the building is in operation.

# APPENDICES

## APPENDIX 1 - INTERNAL GAINS

TM59 Specific Table – Profiles and gains sourced directly from relevant guidance found in TM59.

Room Type	Internal Gain Type	Maximum Sensible Gain	Maximum Latent Gain	Maximum Occupancy	Profile
Kitchen	People	75 W	55 W	1, 2, 3 (1 person per bedroom)	25% from 9am to 10pm
	Lighting	2 W/m <sup>2</sup>			On from 6pm to 11pm
	Equipment	300 W			100% from 6pm to 8pm
					17% from 8pm to Midnight
				17% from Midnight to 6pm	
Living room	People	75 W	55 W	1, 2, 3 (1 person per bedroom)	75% from 9am to 10pm
	Lighting	2 W/m <sup>2</sup>			On from 6pm to 11pm
	Equipment	150 W			40% from 9am to 6pm
					100% from 6pm to 10pm
					40% from 10pm to 12pm
23% from Midnight to 9am					
LKD	People	75 W	55 W	1, 2, 3 (1 person per bedroom)	100% from 9am to 10pm
	Lighting	2 W/m <sup>2</sup>			On from 6pm to 11pm
	Equipment	450 W			24.4% from 9am to 6pm and 10pm to 12pm
					100% from 6pm to 8pm
					44.4% from 8pm to 10pm
18.8% rest of the day					

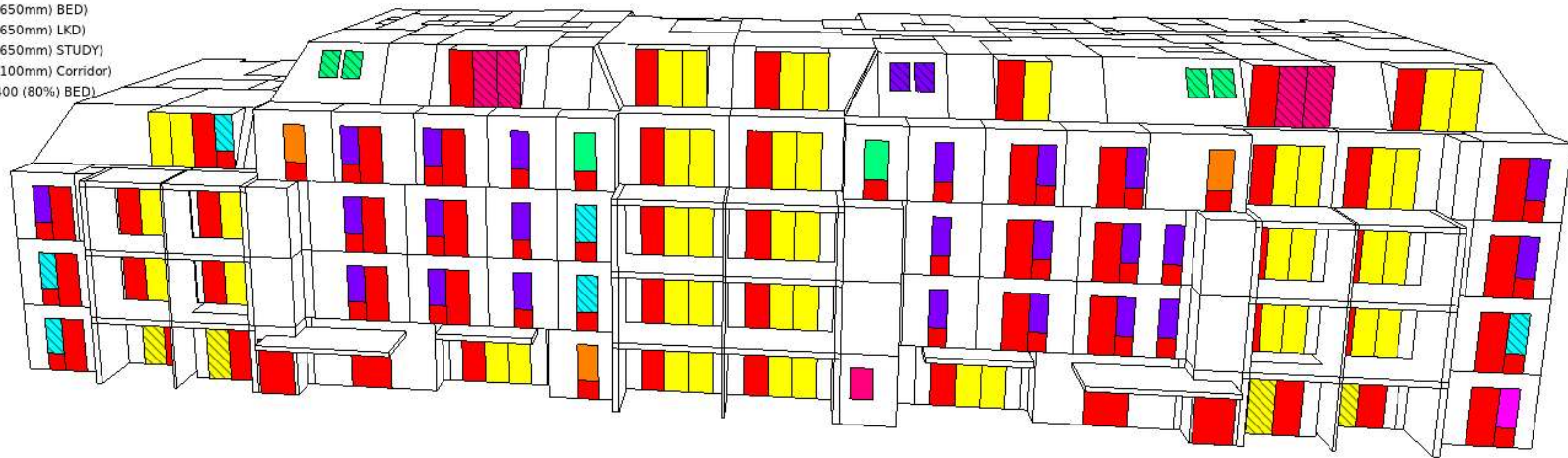


Room Type	Internal Gain Type	Maximum Sensible Gain	Maximum Latent Gain	Maximum Occupancy	Profile
Study	People	75 W	55 W	1	100% from 4pm to 10pm
	Lighting	2 W/m <sup>2</sup>			On from 6pm to 11pm
	Equipment	150 W			100% from 4pm to 10pm
Double Bedrooms	People	75 W	55 W	2	70% from 11pm to 8am
					100% from 8am to 9am and from 10pm to 11pm
					50% from 9am to 10pm
	Lighting	2 W/m <sup>2</sup>			On from 6pm to 11pm
	Equipment	80 W			80 W from 8am to 11pm
10 W during sleeping hours					
Single Bedrooms	People	75 W	55 W	1	70% from 11pm to 8am
	Lighting	2 W/m <sup>2</sup>			On from 6pm to 11pm
	Equipment	80 W			80 W from 8am to 11pm
					10 W during sleeping hours
Utility	Lighting	2 W/m <sup>2</sup>			On from 6pm to 11pm
Hallways	Lighting	2 W/m <sup>2</sup>			On from 6pm to 11pm

## APPENDIX 2 – WINDOW OPENINGS

### A Block

- Opening Type
- XTRN0000 (External window opening)
  - XTRN0007 (Top Hung - 750x750 (650mm) BED)
  - XTRN0008 (Top Hung - 750x750 (650mm) LKD)
  - XTRN0009 (SLiding Door - 1000x2400 (80%) LKD)
  - XTRN0010 (Top Hung - 700x1600 (100mm) BED)
  - XTRN0011 (Top Hung - 700x1600 (100mm) LKD)
  - XTRN0014 (Top Hung - 900x1600 (100mm) BED)
  - XTRN0015 (Top Hung - 900x1600 (100mm) LKD)
  - XTRN0016 (Top Hung - 750x1600 (100mm) BED)
  - XTRN0018 (Top Hung - 750x1100 (100mm) BED)
  - XTRN0022 (Top Hung - 750x1300 (100mm) BED)
  - XTRN0023 (Top Hung - 900x1300 (100mm) BED)
  - XTRN0025 (Side Hung - 700x2400 (90°) LKD)
  - XTRN0026 (Side Hung - 700x2400 (90°) BED)
  - XTRN0027 (Side Hung - 900x2400 (90°) LKD)
  - XTRN0029 (SLiding Door - 1000x2400 (80%) BED 10% night)
  - XTRN0030 (Top Hung - 750x1600 (100mm) LKD)
  - XTRN0031 (Top Hung - 700x1500 (100mm) BED)
  - XTRN0032 (Top Hung - 700x1500 (100mm) LKD)
  - XTRN0033 (Top Hung - 800x1200 (650mm) BED)
  - XTRN0034 (Top Hung - 800x1200 (650mm) LKD)
  - XTRN0035 (Top Hung - 800x1200 (650mm) STUDY)
  - XTRN0036 (Top Hung - 800x1200 (100mm) Corridor)
  - XTRN0037 (SLiding Door - 1000x2400 (80%) BED)



Block A – Openings View 1

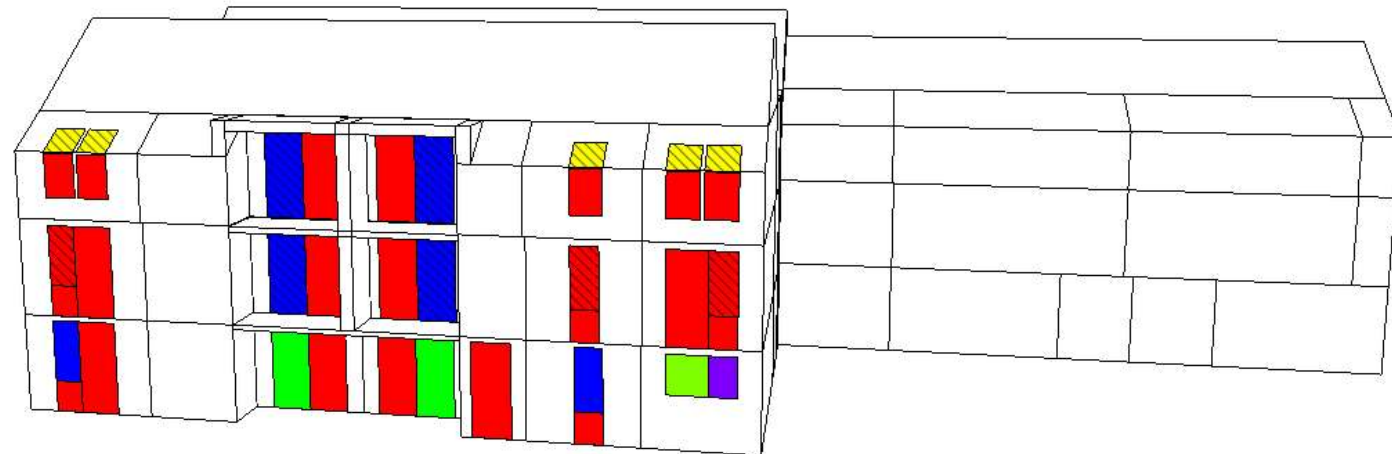
- Opening Type
- XTRN0000 (External window opening)
  - XTRN0007 (Top Hung - 750x750 (650mm) BED)
  - XTRN0008 (Top Hung - 750x750 (650mm) LKD)
  - XTRN0009 (SLiding Door - 1000x2400 (80%) LKD)
  - XTRN0010 (Top Hung - 700x1600 (100mm) BED)
  - XTRN0011 (Top Hung - 700x1600 (100mm) LKD)
  - XTRN0014 (Top Hung - 900x1600 (100mm) BED)
  - XTRN0015 (Top Hung - 900x1600 (100mm) LKD)
  - XTRN0016 (Top Hung - 750x1600 (100mm) BED)
  - XTRN0018 (Top Hung - 750x1100 (100mm) BED)
  - XTRN0022 (Top Hung - 750x1300 (100mm) BED)
  - XTRN0023 (Top Hung - 900x1300 (100mm) BED)
  - XTRN0025 (Side Hung - 700x2400 (90°) LKD)
  - XTRN0026 (Side Hung - 700x2400 (90°) BED)
  - XTRN0027 (Side Hung - 900x2400 (90°) LKD)
  - XTRN0029 (SLiding Door - 1000x2400 (80%) BED 10% night)
  - XTRN0030 (Top Hung - 750x1600 (100mm) LKD)
  - XTRN0031 (Top Hung - 700x1500 (100mm) BED)
  - XTRN0032 (Top Hung - 700x1500 (100mm) LKD)
  - XTRN0033 (Top Hung - 800x1200 (650mm) BED)
  - XTRN0034 (Top Hung - 800x1200 (650mm) LKD)
  - XTRN0035 (Top Hung - 800x1200 (650mm) STUDY)
  - XTRN0036 (Top Hung - 800x1200 (100mm) Corridor)
  - XTRN0037 (SLiding Door - 1000x2400 (80%) BED)



Block A – Openings View 2

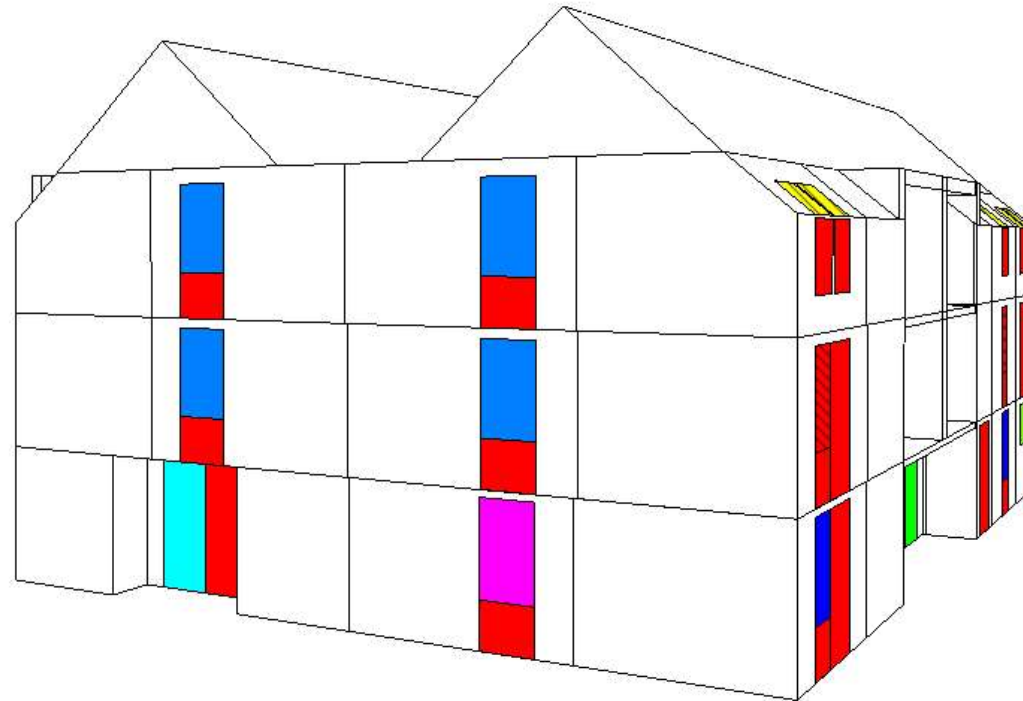
**B Block**

- Opening Type
- XTRN0000 (External window opening)
  - XTRN0009 (SLiding Door - 1000x2400 (80%) LKD)
  - XTRN0010 (Top Hung - 700x1600 (100mm) BED)
  - XTRN0011 (Top Hung - 700x1600 (100mm) LKD)
  - XTRN0029 (SLiding Door - 1000x2400 (80%) BED 10% night)
  - XTRN0038 (Top Hung - 1000x1600 (100mm) BED)
  - XTRN0039 (Top Hung - 1000x1600 (100mm) LKD)
  - XTRN0040 (Top Hung - 650x1600 (100mm) BED)
  - XTRN0042 (Top Hung - 700x1000 (100mm) BED)
  - XTRN0043 (Top Hung - 1000x1000 (100mm) BED)
  - XTRN0044 (Top Hung - 1000x1550 (100mm) BED)
  - XTRN0045 (Top Hung - 1000x1550 (100mm) LKD)
  - XTRN0046 (Top Hung - 700x1550 (100mm) BED)
  - XTRN0047 (Top Hung - 700x1550 (100mm) LKD)
  - XTRN0048 (SLiding Door - 1000x2350 (80%) LKD)
  - XTRN0050 (Top Hung - 800x800 (30°) BED)
  - XTRN0051 (Top Hung - 800x800 (30°) LKD)



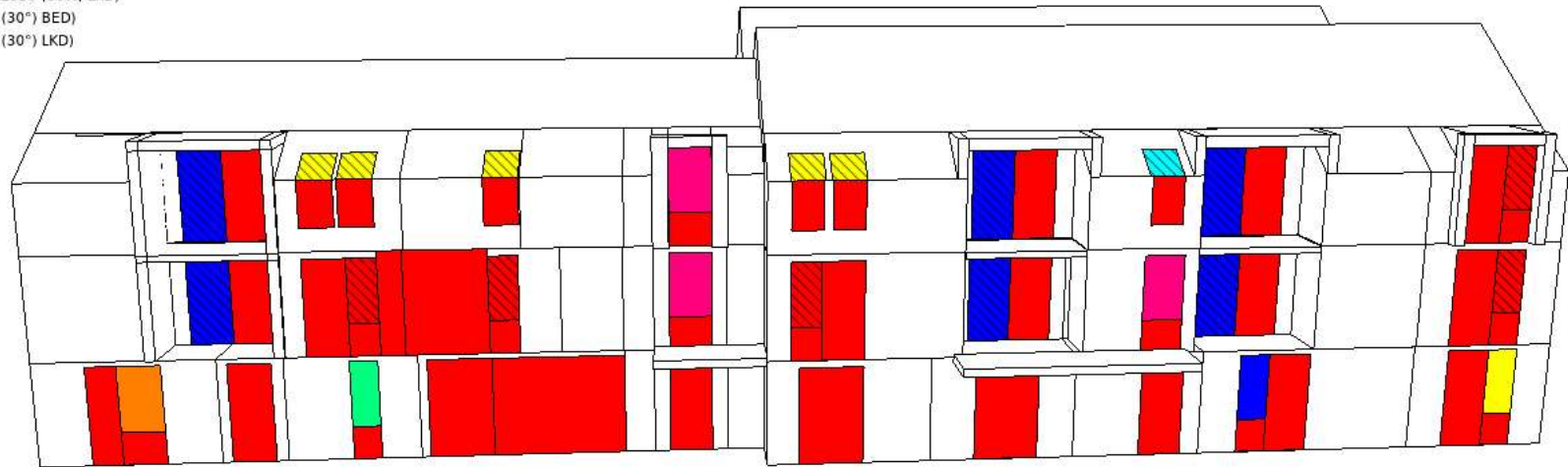
Block B – Openings View 1

- Opening Type
- XTRN0000 (External window opening)
  - XTRN0009 (SLiding Door - 1000x2400 (80%) LKD)
  - XTRN0010 (Top Hung - 700x1600 (100mm) BED)
  - XTRN0011 (Top Hung - 700x1600 (100mm) LKD)
  - XTRN0029 (SLiding Door - 1000x2400 (80%) BED 10% night)
  - XTRN0038 (Top Hung - 1000x1600 (100mm) BED)
  - XTRN0039 (Top Hung - 1000x1600 (100mm) LKD)
  - XTRN0040 (Top Hung - 650x1600 (100mm) BED)
  - XTRN0042 (Top Hung - 700x1000 (100mm) BED)
  - XTRN0043 (Top Hung - 1000x1000 (100mm) BED)
  - XTRN0044 (Top Hung - 1000x1550 (100mm) BED)
  - XTRN0045 (Top Hung - 1000x1550 (100mm) LKD)
  - XTRN0046 (Top Hung - 700x1550 (100mm) BED)
  - XTRN0047 (Top Hung - 700x1550 (100mm) LKD)
  - XTRN0048 (SLiding Door - 1000x2350 (80%) LKD)
  - XTRN0050 (Top Hung - 800x800 (30°) BED)
  - XTRN0051 (Top Hung - 800x800 (30°) LKD)



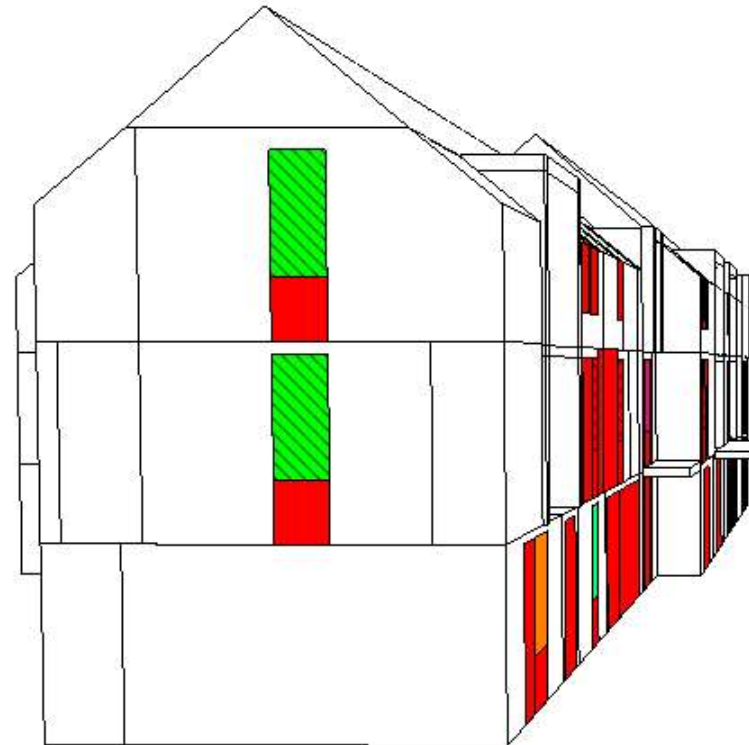
Block B – Openings View 2

- Opening Type
- XTRN0000 (External window opening)
  - XTRN0009 (SLiding Door - 1000x2400 (80%) LKD)
  - XTRN0010 (Top Hung - 700x1600 (100mm) BED)
  - XTRN0011 (Top Hung - 700x1600 (100mm) LKD)
  - XTRN0029 (SLiding Door - 1000x2400 (80%) BED 10% night)
  - XTRN0038 (Top Hung - 1000x1600 (100mm) BED)
  - XTRN0039 (Top Hung - 1000x1600 (100mm) LKD)
  - XTRN0040 (Top Hung - 650x1600 (100mm) BED)
  - XTRN0042 (Top Hung - 700x1000 (100mm) BED)
  - XTRN0043 (Top Hung - 1000x1000 (100mm) BED)
  - XTRN0044 (Top Hung - 1000x1550 (100mm) BED)
  - XTRN0045 (Top Hung - 1000x1550 (100mm) LKD)
  - XTRN0046 (Top Hung - 700x1550 (100mm) BED)
  - XTRN0047 (Top Hung - 700x1550 (100mm) LKD)
  - XTRN0048 (SLiding Door - 1000x2350 (80%) LKD)
  - XTRN0050 (Top Hung - 800x800 (30°) BED)
  - XTRN0051 (Top Hung - 800x800 (30°) LKD)



Block B – Openings View 3

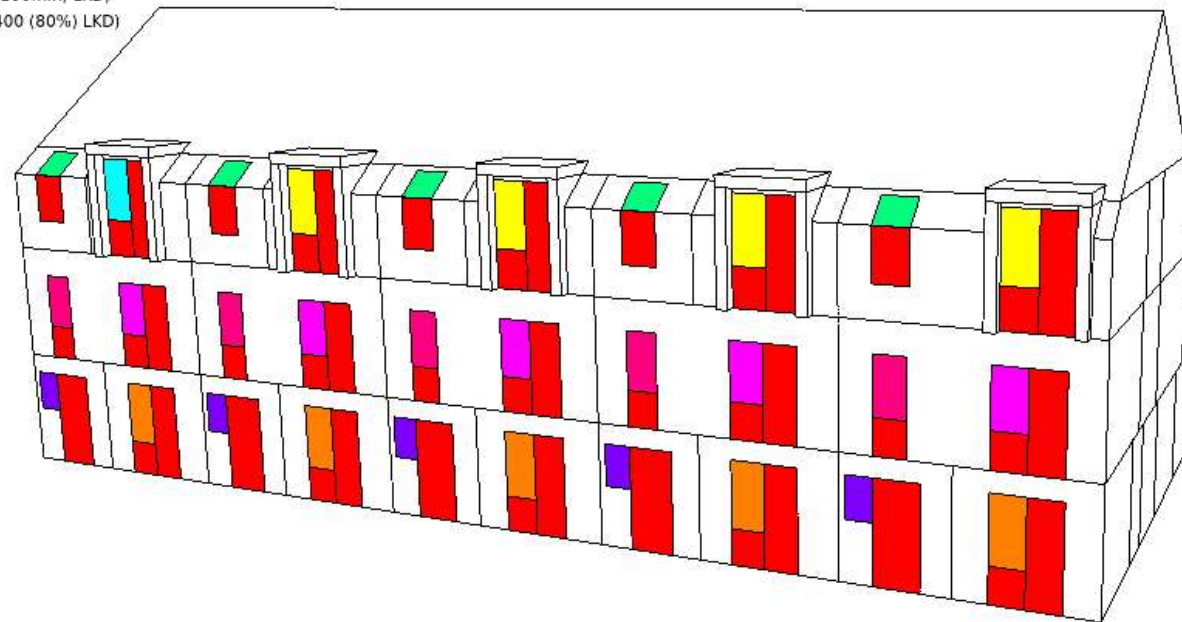
- Opening Type
- XTRN0000 (External window opening)
  - XTRN0009 (SLiding Door - 1000x2400 (80%) LKD)
  - XTRN0010 (Top Hung - 700x1600 (100mm) BED)
  - XTRN0011 (Top Hung - 700x1600 (100mm) LKD)
  - XTRN0029 (SLiding Door - 1000x2400 (80%) BED 10% night)
  - XTRN0038 (Top Hung - 1000x1600 (100mm) BED)
  - XTRN0039 (Top Hung - 1000x1600 (100mm) LKD)
  - XTRN0040 (Top Hung - 650x1600 (100mm) BED)
  - XTRN0042 (Top Hung - 700x1000 (100mm) BED)
  - XTRN0043 (Top Hung - 1000x1000 (100mm) BED)
  - XTRN0044 (Top Hung - 1000x1550 (100mm) BED)
  - XTRN0045 (Top Hung - 1000x1550 (100mm) LKD)
  - XTRN0046 (Top Hung - 700x1550 (100mm) BED)
  - XTRN0047 (Top Hung - 700x1550 (100mm) LKD)
  - XTRN0048 (SLiding Door - 1000x2350 (80%) LKD)
  - XTRN0050 (Top Hung - 800x800 (30°) BED)
  - XTRN0051 (Top Hung - 800x800 (30°) LKD)



Block B – Openings View 4

Mews Terrace 1

- Opening Type
- XTRN0000 (External window opening)
  - XTRN0009 (SLiding Door - 1000x2400 (80%) LKD)
  - XTRN0011 (Top Hung - 700x1600 (100mm) LKD)
  - XTRN0012 (Top Hung - 750x1500 (100mm) BED)
  - XTRN0013 (Top Hung - 750x1500 (100mm) LKD)
  - XTRN0021 (Top Hung - 750x1300 (100mm) LKD)
  - XTRN0031 (Top Hung - 700x1500 (100mm) BED)
  - XTRN0050 (Top Hung - 800x800 (30°) BED)
  - XTRN0054 (Side Hung - 600x950 (100mm) LKD)
  - XTRN0055 (Side Hung - 900x1400 (100mm) BED)
  - XTRN0056 (Side Hung - 900x1400 (100mm) STUDY)
  - XTRN0057 (Top Hung - 700x1300 (100mm) LKD)
  - XTRN0065 (Folding Door - 1000x2400 (80%) LKD)

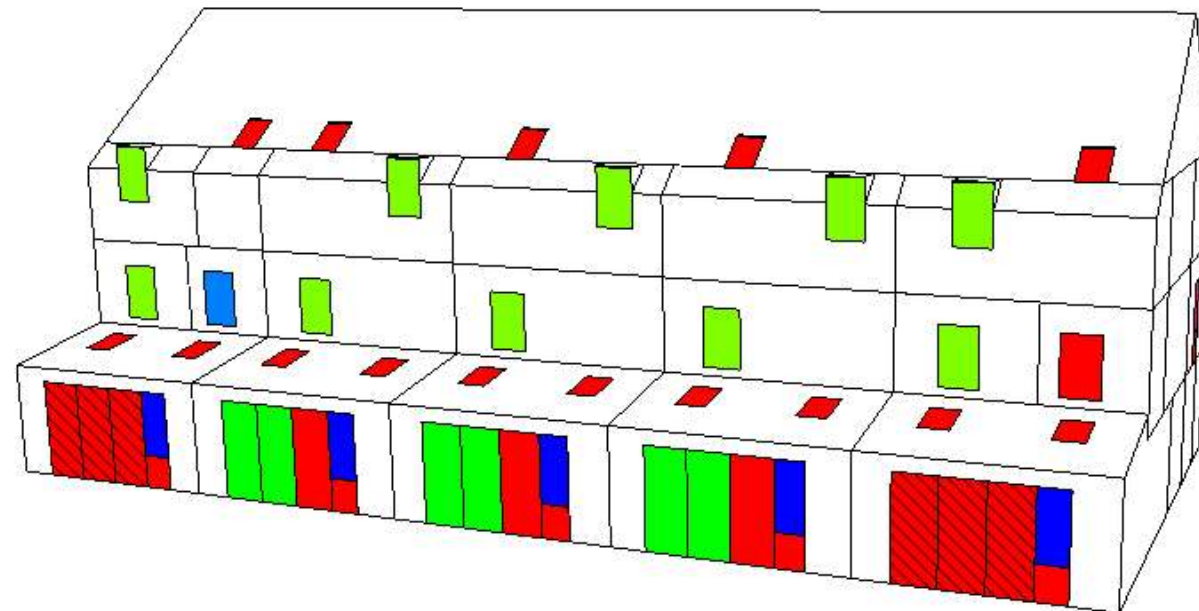


Mews Terrace 1 – Openings View 1



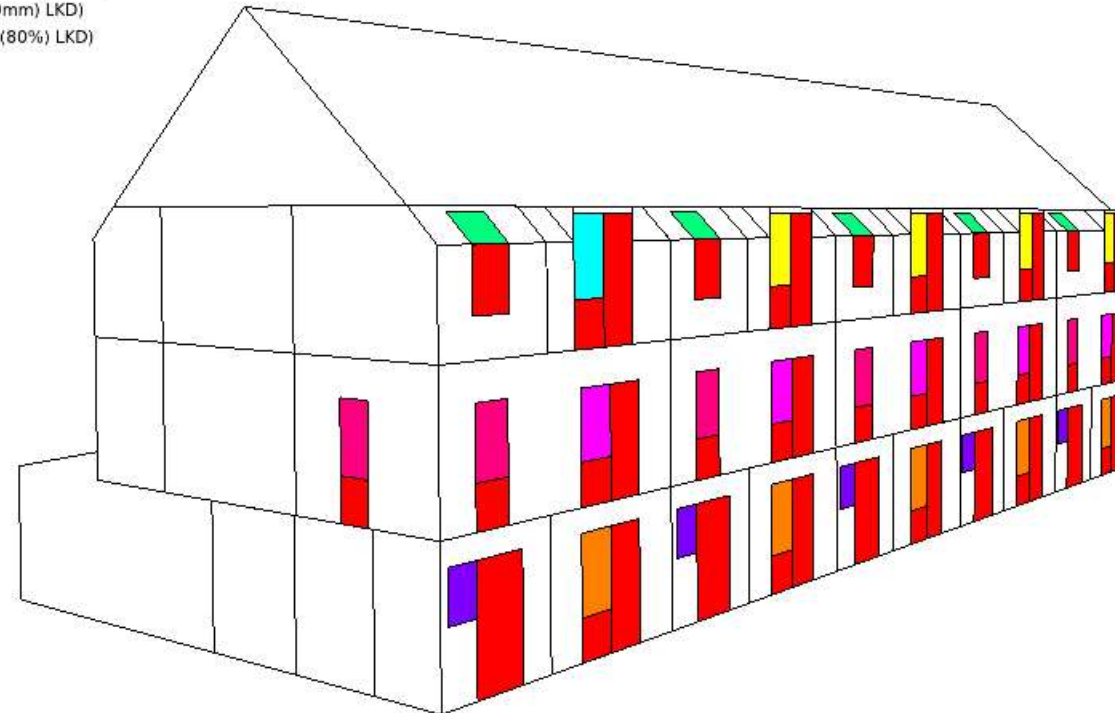
Opening Type

- XTRN0000 (External window opening)
- XTRN0009 (Sliding Door - 1000x2400 (80%) LKD)
- XTRN0011 (Top Hung - 700x1600 (100mm) LKD)
- XTRN0012 (Top Hung - 750x1500 (100mm) BED)
- XTRN0013 (Top Hung - 750x1500 (100mm) LKD)
- XTRN0021 (Top Hung - 750x1300 (100mm) LKD)
- XTRN0031 (Top Hung - 700x1500 (100mm) BED)
- XTRN0050 (Top Hung - 800x800 (30°) BED)
- XTRN0054 (Side Hung - 600x950 (100mm) LKD)
- XTRN0055 (Side Hung - 900x1400 (100mm) BED)
- XTRN0056 (Side Hung - 900x1400 (100mm) STUDY)
- XTRN0057 (Top Hung - 700x1300 (100mm) LKD)
- XTRN0065 (Folding Door - 1000x2400 (80%) LKD)



Mews Terrace 1 – Openings View 2

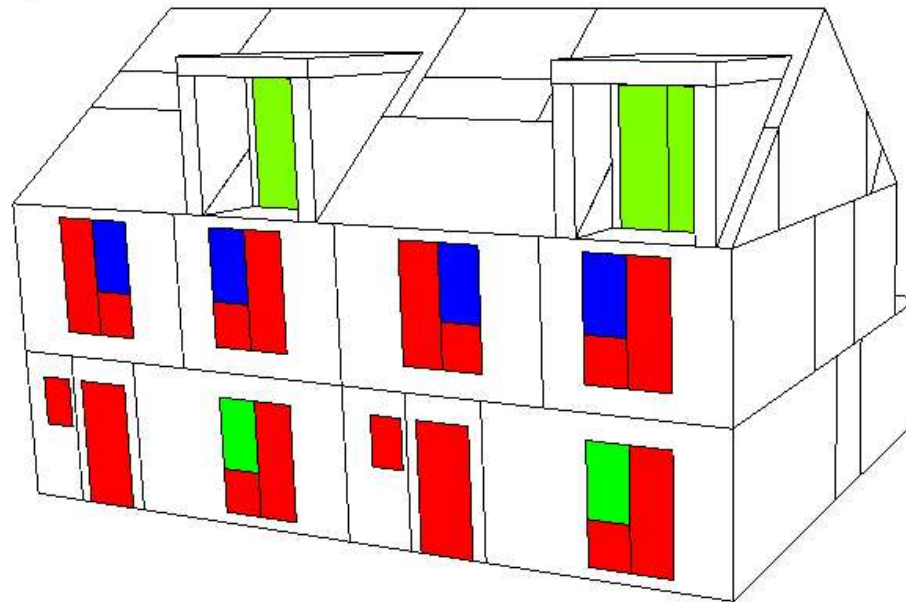
- Opening Type
- XTRN0000 (External window opening)
  - XTRN0009 (SLiding Door - 1000x2400 (80%) LKD)
  - XTRN0011 (Top Hung - 700x1600 (100mm) LKD)
  - XTRN0012 (Top Hung - 750x1500 (100mm) BED)
  - XTRN0013 (Top Hung - 750x1500 (100mm) LKD)
  - XTRN0021 (Top Hung - 750x1300 (100mm) LKD)
  - XTRN0031 (Top Hung - 700x1500 (100mm) BED)
  - XTRN0050 (Top Hung - 800x800 (30" BED)
  - XTRN0054 (Side Hung - 600x950 (100mm) LKD)
  - XTRN0055 (Side Hung - 900x1400 (100mm) BED)
  - XTRN0056 (Side Hung - 900x1400 (100mm) STUDY)
  - XTRN0057 (Top Hung - 700x1300 (100mm) LKD)
  - XTRN0065 (Folding Door - 1000x2400 (80%) LKD)



Mews Terrace 1 – Openings View 3

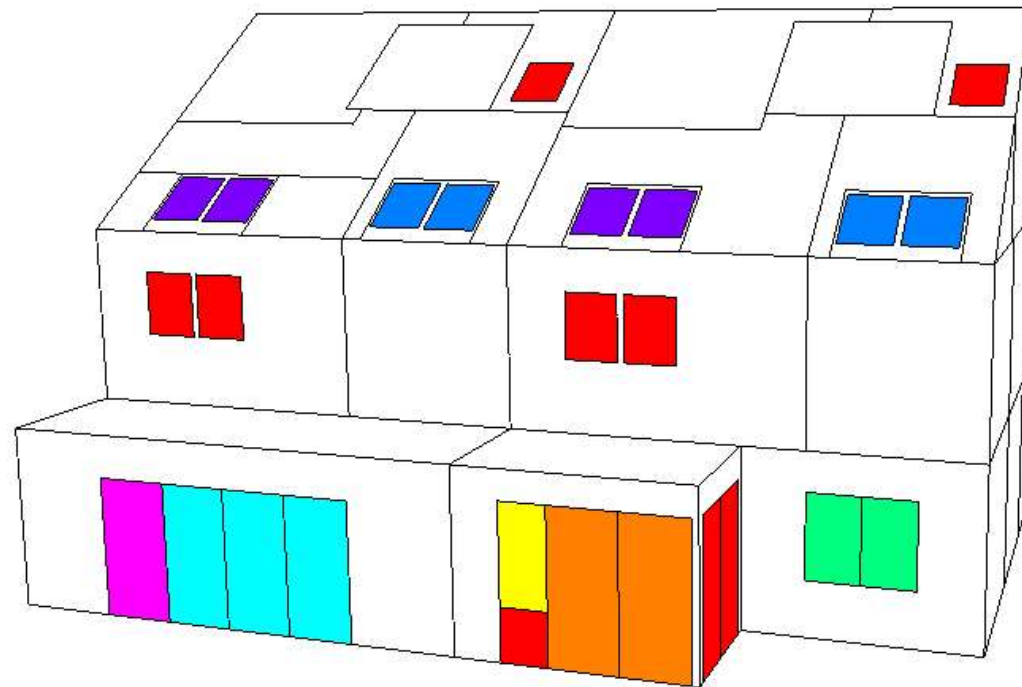
Mews Terrace 2

- Opening Type
- XTRN0000 (External window opening)
  - XTRN0021 (Top Hung - 750x1300 (100mm) LKD)
  - XTRN0022 (Top Hung - 750x1300 (100mm) BED)
  - XTRN0032 (Top Hung - 700x1500 (100mm) LKD)
  - XTRN0059 (SLiding Door - 1000x2100 (80%) LKD)
  - XTRN0060 (Side Hung - 1000x2100 (90°) LKD)
  - XTRN0061 (Side Hung - 1000x2300 (90°) LKD)
  - XTRN0062 (Side Hung - 800x1300 (100mm) LKD)
  - XTRN0063 (Top Hung - 800x1000 (100mm) BED)
  - XTRN0064 (Side Hung - 850x2300 (90°) BED)
  - XTRN0066 (Top Hung - 800x1000 (100mm) STUDY)
  - XTRN0068 (Internal Bedroom door)



Mews Terrace 2 – Openings View 1

- Opening Type
- XTRN0000 (External window opening)
  - XTRN0021 (Top Hung - 750x1300 (100mm) LKD)
  - XTRN0022 (Top Hung - 750x1300 (100mm) BED)
  - XTRN0032 (Top Hung - 700x1500 (100mm) LKD)
  - XTRN0059 (SLiding Door - 1000x2100 (80%) LKD)
  - XTRN0060 (Side Hung - 1000x2100 (90°) LKD)
  - XTRN0061 (Side Hung - 1000x2300 (90°) LKD)
  - XTRN0062 (Side Hung - 800x1300 (100mm) LKD)
  - XTRN0063 (Top Hung - 800x1000 (100mm) BED)
  - XTRN0064 (Side Hung - 850x2300 (90°) BED)
  - XTRN0066 (Top Hung - 800x1000 (100mm) STUDY)
  - XTRN0068 (Internal Bedroom door)



Mews Terrace 2 – Openings View 2